

## HCFA RECOMMENDATIONS ON AAPCC AND ACR

### Adjusted Average Per Capita Cost (AAPCC)

HCFA is currently pursuing one of the expert panel's major recommendations for refining the AAPCC: implementation of a refined prior-use model in demonstrations. The model, known as the Diagnostic Cost Group (DCG) methodology, is the result of 4 years of research at Boston and Brandeis Universities. The model utilizes diagnostic information from the hospitalizations among a Health Maintenance Organization's (HMO's) enrollees during an earlier period to predict Medicare payments in a future year. The conceptual justification for the method is that certain reasons for hospitalization are predictably associated with higher levels of future health care needs.

HCFA has developed an implementation plan to initiate pilot tests of the DCG model with a few HMOs. In predicting prospective payment for HMOs, characteristics of their enrollees, such as age, sex, welfare status, and information on prior hospitalizations, are used. Only information from groups of non-discretionary diagnoses is factored into the payment formula to eliminate any incentives to induce inefficient provider behavior and unfair payments.

HCFA anticipates pilot demonstrations will begin in the spring 1988. During the implementation stage, HCFA will evaluate the demonstrations with respect to ease of operation. It is anticipated that the resulting payments to HMOs will be fairer to both HCFA and the HMOs and will result in a more efficient information reporting system between HCFA and the HMOs.

After assessing the operational aspects of the pilot demonstrations, HCFA will enter a second phase of demonstration activity involving a larger number of HMOs. The purpose of these demonstrations will extend beyond operational issues and test validity, accuracy, and market response to the new DCG payment method. HMOs will be selected using a research design in which geographic location, market penetration, extent of areawide competition, size, and tenure will be considered. An evaluation will assess accuracy of the payment model and HMO and beneficiary response to a revised payment methodology.

HCFA also plans to demonstrate a group-rated payment model in the context of a Medicare Insured Group (MIG). This method of payment is an alternative to the AAPCC which is currently used to pay individually enrolled beneficiaries in HMOs. The AAPCC is referred to as a community-rated payment model. In the MIG model, an employer or union organization would contract to provide to its retirees the Medicare benefit package, as well as any employer/union-offered supplemental benefits. The organization would be at risk to provide all contracted services for the per capita payment, based on the experience of the group.

Over a defined past period, health care experience of the retiree group would be collected and projected forward to represent a more accurate benchmark of what retirees would have cost HCFA in the fee-for-service (FFS) system. The payment to the MIG would be set at some percentage of the experience rate to guarantee savings to HCFA. As in all demonstrations, HCFA will evaluate the payment model used in the MIG demonstration to assess accuracy and appropriateness of the procedure.

#### Adjusted Community Rate (ACR)

The enclosed study of the ACR process suggests one possible option for HCFA to consider: the elimination of the requirement for prospective rate determination through the ACR. The report, however, does not recommend this action. Based on findings in the report and other analyses of the implementation of the ACR process, HCFA recommends that the ACR requirement be eliminated. Our reasons for the recommendation are presented below:

##### o Validity of the Underlying Concept

Standard economic analysis suggests that it is appropriate for the rate of profit realized by an entity to increase with the amount of risk assumed. The ACR process links permissible profit to what an HMO or Competitive Medical Plan (CMP) earns in the private market; however, the risk assumed by these entities in serving Medicare beneficiaries is higher. Medicare beneficiaries are enrolled individually, not through preformed groups, and it is more difficult for an HMO to predict costs for Medicare enrollees than it is for private enrollees.

The uncertainties associated with the AAPCC payment process add to the risk factor assumed by HMOs. Evidence suggests that the AAPCC may not be effective at adjusting payments to reflect differences in the costs to be incurred for enrollees with varying degrees of health status. Although the AAPCC could systematically overpay some organizations for enrollees that need less medical care than average, the ACR may pose a special problem for HMOs whose Medicare enrollees are more costly than average and whose private enrollees cost less than average.

If an HMO enrolls a disproportionate number of high-cost enrollees within the various actuarial categories constituting the AAPCC, the amount Medicare pays the HMO will be less than it would have cost to care for those patients in the FFS sector of Medicare. The plan's ACR could also be artificially low if the adjustments used in the ACR are not calculated using data that accurately represent the projected utilization and cost for that mix of enrollees. The HMO could then face the potentially disastrous financial

consequences of two errors compounding one another. The HMO would be paid too little by Medicare and then would be required to pass on to beneficiaries nonexistent profits (defined as the difference between projected payment and the ACR).

In interviews with HMOs, most plans suggested they would be willing to stay in the Medicare market as long as significant losses were not anticipated over an extended period. HMO board members also seek assurances that commercial accounts do not subsidize Medicare enrollees. If losses seem apparent, or if Medicare profits are held too low, many HMOs will refuse to participate in the program. Those that do participate may feel compelled to protect themselves by seeking to enroll only low-risk Medicare patients. Although eliminating the ACR rule would not eliminate the incentive for plans to skim the best risks, the ACR rule may aggravate the problem. Under the current rules, HMOs face an asymmetric system of potential risks and rewards. The risk from enrolling high-cost Medicare patients is unlimited; the potential profit from efficiency and effective health care management is capped by the ACR.

The problems resulting from the ACR may also limit the growth of HMOs and inhibit their efforts to improve services. The problem may be especially severe for new HMOs. Because of start-up costs, new plans are usually less profitable than older plans. If a new plan earns a low rate of profit on its private contracts, the ACR rule will, at least in theory, assure that the plan earns the same low profit on its Medicare contract. Moreover, the ACR rule will limit the plan's profit, regardless of how well the plan does in reducing the health care costs of the elderly and regardless of how reasonable the plan's Medicare profit might be. Without profits, new plans may find it difficult both to expand and to add new facilities to enhance the services offered existing Medicare enrollees.

HMOs consistently declared that in order to succeed in the market place, they need to establish a lower premium and offer benefits more generous than prevailing comprehensive Medigap indemnity policies. HMOs also want to offer coverage to enrollees that age into Medicare that is comparable to their commercial accounts. For the 1987 contract year, over 50 percent of HMO contractors waived all or part of their premium amount over the approved ACR amounts. Thus, HMOs offer extra benefits and lower premiums for reasons other than the ACR requirement for distributing profits.

One of the purposes of the ACR requirement is to constrain profits in Tax Equity and Fiscal Responsibility Act of 1982 (TEFRA) HMOs to that experienced on the private line of business. The ACR process does constrain profit per enrollee but does not constrain total profits. Requiring HMOs to

return to their enrollees the difference between their ACR and the amount received from Medicare through additional benefits and reduced premiums will have the effect of attracting new enrollees. HMOs could then increase their profits by enrolling more Medicare beneficiaries. The ACR also does not eliminate an undesirable incentive that could be used by unscrupulous HMOs. A profit-oriented HMO could cut services inappropriately and increase profits through reduced cost.

#### Operation of the ACR Process

The Brandeis study investigated several administrative aspects of the ACR process from both the HMO and HCFA perspectives. The process exhibited several problems, ranging from accuracy to extensive burden on the part of HMOs.

Two types of potential accuracy problems exist in computation of the ACR. The first is an incentive to allocate expenses to individual service categories with greater adjustment factors when any ambiguity exists in classification. Second, because of inadequate plan data, many plans either resort to published studies to make adjustments or do not make warranted adjustments. Discussions with actuarial consultants revealed that a minimum enrollee-month base of 30,000 was needed to begin generating estimates with any credibility. A minimum enrollee-month base of about 50,000 and 3 to 4 years experience in controlling Medicare utilization were suggested to lead to fairly stable utilization patterns that could be relied upon for meaningful multipliers. Very few HMOs that qualified under TEFRA satisfy this criterion. As a result, there is an initial period during which the ACR is very unreliable. Even if the ACR concept would work in the long run, an unlucky plan may be bankrupted long before then.

The ACR process is administratively burdensome from the point of view of the HMOs and HCFA. Although HMOs regularly prepare internal prospective budgets, the ACR process requires different calculations, such as complexity factor adjustments, that require considerable internal resources to develop. Information systems are often inadequate to capture the data needed for adjustments. HMO models with salaried or capitated physicians and other providers face the greatest difficulty accessing detailed service-level data, which are required to calculate the volume and complexity adjustment factors. HMOs find it difficult in many cases to adjust their commercial base rates to fit the standard Medicare package of services required to develop the initial rate, the basis of the ACR.

HCFA is also faced with administrative problems in reviewing ACR proposals. Year-end peak load ACR submissions have required several modifications to the review process, such as the use of short-focused ACR desk reviews and abbreviated auditing of HMO financial and utilization data



6. used in the ACR submittal. Because of the scheduling of AAPCC calculations and the timing of HMO contract periods, there is an uneven workload for HCFA's Office of Financial Management, requiring supplementation of its accounting staff with temporary employees. This creates internal staffing problems and detracts from HCFA's efforts to create consistent and continuous overview of the ACR review process.

## INTRODUCTION

### Medicare Risk Contracts and the AAPCC

With the passage of the Tax Equity and Fiscal Responsibility Act (TEFRA) in 1982, health maintenance organizations (HMOs) and competitive medical plans (CMPs) were permitted to enter into risk contracts for providing health care services to Medicare beneficiaries. Hereafter, for simplicity, both entities will be referred to as HMOs.

Capitation payments under risk contracts are currently set, by regulation, at 95 percent of the adjusted average per capita cost (AAPCC), defined as the expected cost of treating Medicare HMO enrollees had they remained in the local fee-for-service sector.

The AAPCC is the product of three factors:

- a. The USPPCC. - The projected per capita cost, for the nation as a whole, of treating Medicare beneficiaries.
- b. Geographic adjustment. - A county-specific adjustment which reflects historic differences between national and local per capita costs.
- c. Demographic adjustment. - An HMO-specific adjustment which takes into account differences in the age, sex, welfare status, and institutional status of the specific beneficiaries enrolled in the HMO relative to those in the local fee-for-service sector.

### The OBRA Mandate

Recognizing the importance of the AAPCC, Congress mandated a study of ways to improve its accuracy. Responding to this mandate, the Health Care Financing Administration (HCFA) adopted the following two-pronged study approach:

- a. Expert panel - A national panel of leading actuaries, economists, statisticians, and industry representatives was convened to review the technical concerns relating to the AAPCC, to discuss possible solutions, and to make recommendations for improving the AAPCC.
- b. Technical report - A contract was entered into with The Circle, Inc., to perform the study. The actuarial firm of Milliman and Robertson (M&R) was retained by the contractor to prepare a technical report on the AAPCC, covering the issues, possible solutions, and its own recommendations.

The Milliman and Robertson (M&R) report served as the basis of the panel deliberations. The report was reviewed in detail, with M&R actuaries participating in the panel discussions. In addition, HCFA arranged for presentations for the panel on the most current AAPCC research activities relating to AAPCC refinement.

Members of the study panel, key researchers/presenters, and other participants in this effort, are identified in Appendix A. The panel, chaired by Dr. Joseph Newhouse of the Rand Corporation, met on June 19, August 6, and August 12-13, 1987. The M&R report is presented in its entirety as Appendix B. Appendices C through G are special handouts developed by members of the panel and others for distribution and discussion at the panel meetings. Appendix H contains the minutes of the meetings.

#### Framework for the Recommendations

The M&R report identified four goals of the AAPCC payment mechanism and eight criteria for evaluating AAPCC refinements. These goals and criteria served as a general framework for the panel's discussions. They are outlined below:

##### A. Major Goals of the AAPCC

1. **Development of an Accurate Payment Schedule.** The AAPCC should reflect what HMO members would have cost Medicare had they not been members of the HMO, under current law and regulations.

2. **Maintenance of Quality Care.** The AAPCC should be high enough to assure that a contracting organization would provide quality care to its Medicare members.
3. **Creation of a level playing field.** The AAPCC should favor neither HMOs nor fee-for-service providers, thus enhancing the number of "fair choices" which Medicare enrollees will have in deciding where to seek health care.
4. **Generation of Medicare Program Savings.** The AAPCC should be developed in a way that, as a minimum, does not increase the long term cost of providing medical care under the Medicare program.

B. Evaluation Criteria for AAPCC Enhancements

1. **Biased Selection.** Concern has been expressed that the AAPCC does not adequately adjust the payment for healthier than average Medicare HMO enrollees. The AAPCC should be structured such that there is little opportunity for an organization to benefit from biased selection. At the same time, any approach to solving this problem should provide appropriate payment if unfavorable selection occurs. The payment mechanism should be adequate to cover the costs of care of those enrollees who are most in need of care.
2. **Simplicity and Credibility.** Much of the current confusion over the AAPCC has resulted from misunderstandings about both the purposes and the operational aspects of the AAPCC. The AAPCC should be conceptually simple and credible to the organizations who have their payment based upon the AAPCC.
3. **Stability.** The random variability in each area's AAPCC from year to year should be kept to a minimum.

4. **Practicality.** The AAPCC should be a practical mechanism for developing rates. The development should be consistent from year to year and be from data sources which are reasonably practical to maintain.
5. **Data Availability.** While any immediate improvement to the AAPCC needs to focus on current data availability, possible enhancements should not be limited to existing data within the Health Care Financing Administration.
6. **Effect on the Current Market.** Any potential improvements to the AAPCC should be evaluated to determine the effect that they will have on the current Medicare Risk Contract market.
7. **Future Viability of Risk Contracting Organizations.** The viability of organizations that currently contract with Medicare should be carefully considered under any new proposed AAPCC methodology.
8. **Cost to the United States Government.** Any proposed change in the AAPCC methodology should be evaluated with regard to its effect on Medicare program expenditures.

### Structure of the Report

This report synthesizes the panel's deliberations and recommendations. The report is in six major sections:

1. Calculation of the USPCC (U.S. Per Capita Cost)
2. Geographic Adjustments
3. Geographic Reconfiguration
4. Biased Selection
5. Demographic Factors
6. Other Issues

Each section contains an introductory statement and a discussion of perceived problems and proposed solutions. Then the panel's recommendations follow.

## 1. CALCULATION OF THE USPCC (U.S. Per Capita Cost)

The USPCC is the starting point for the calculation of the AAPCCs. Separate USPCCs are projected for Part A and Part B, for aged, disabled, and ESRD Medicare enrollees. There are, therefore, six USPCCs for each calendar year. The M&R report identifies several issues relating to the calculation.

### 1.1 Perceived Problems

- o According to the M&R report, the accuracy of the USPCC computation may need improvement. Although the Part A estimates for 1985 through 1987 and the Part B estimate for 1985 seem to be accurate (less than 2 percent error as of the 1987 Trustees Report), the Part B estimates for 1986 and 1987 are at this time significantly understated (9 percent and 12 percent, respectively).
- o Part of the estimating procedures affecting accuracy is the matter of timing. Calculation of the USPCC currently takes place just prior to HCFA's annual reconstruction of claims, in which the percentage of previous years' incurred claims as yet unpaid is estimated. M&R notes that the USPCC calculation would be improved if it were performed immediately following, rather than preceding, the annual reconstruction of claims.
- o Other M&R concerns, shared by the panel, include the need for more complete documentation of the USPCC projection process — in particular the assumptions on which the calculation is based. A point particularly emphasized by M&R is that HCFA should exclude from the projection process any proposed program savings associated with legislative enactments which have not yet been implemented. (HCFA's Chief Actuary reported that where the legislation includes an implementation date, HCFA has no choice but to assume that that date will be met.)

## 1.2 Proposed Solutions<sup>1</sup>

- a. Retroactive adjustment. - Permit retroactive adjustment if the USPCC proves to be in error.
- b. Stabilization fund. - Create a stabilization fund to smooth out forecasting errors through future payments.
- c. Prospective adjustment. - If there is consistent bias, consider the possibility of prospective adjustment as well.
- d. Timing of the calculation. - Calculate the USPCC immediately following the historic reconstruction of Medicare claims.
- e. Documentation. - Disclose, each year, all assumptions that enter into the USPCC calculation and allow sufficient time for industry review and comment.

## 1.3 Panel Recommendations<sup>2</sup>

### **Recommendation 1:**

**Document the methodology used in projecting the USPCC.** Publish the underlying assumptions and allow HMOs to comment on the process. Include information on the actual and projected AAPCCs from prior years in order that the accuracy of the estimates can be evaluated.

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<sup>1</sup> The proposed solutions cited in this report are a composite of those suggested by M&R and those initiated by the panel. They are not necessarily those adopted by the panel and included in the final recommendations shown in this report.

<sup>2</sup> Items listed as recommendations reflect the general "sense" of the panel. Where there is significant minority dissent, the nature of the dissent is shown.

**Recommendation 2:**

Do not initiate any procedure to retroactively adjust AAPCC payments to account for differences between the projected and actual USPC.

There was considerable discussion of the pros and cons of a retroactive adjustment to the AAPCC:

A stabilization fund — from which future payments for underestimated USPCs would be made — was considered. If the USPCs were too high, however, the HMOs would need to "pay back" the stabilization fund, which would create difficulties for HMO planning and budgeting.

If retroactive adjustments were instituted, how long to wait before any retroactive adjustment was another issue. In the final analysis, retroactive adjustments were considered more likely to worsen the problem than to improve it by making it more difficult to set an appropriate level for the supplemental premium.

The issue of prospective adjustment was discussed. There was a general consensus that there was a need for (a) longer term follow-up on the pattern of the USPC projections and actuals and (b) publication of these values.

The panel agreed that if the USPCs were based on a more recent historical reconstruction it would probably improve the accuracy. This would require additional actuarial staff — a course the panel chose to let the Administration work out.



## 2. GEOGRAPHIC ADJUSTMENTS

The geographic adjustor of the AAPCC is county specific. It is the average of the ratios of Medicare fee-for-service (FFS) per capita costs within the county to the national FFS per capita costs for the 5 most recent years for which data are available. The most recent of the 5 years is usually 3 years prior to the year for which the AAPCC is being calculated.

### 2.1 Perceived Problems

- o The 5-year average shows large random fluctuations from year-to-year in certain counties. This may come about because of small county populations or because of high HMO penetration, leaving few beneficiaries in the FFS sector. In addition, if there is biased selection, those remaining in the FFS sector will not be typical of those enrolling in HMOs.
- o Changes in the year-to-year demographic makeup of the county population are not accounted for.
- o Claims processing lags might have a large effect on individual county AAPCCs.
- o Data used in calculating the AAPCC have the potential for overstating the AAPCC in some counties while understating it in other counties. Persons who migrate between warm and cool climates during the year ("snowbirds") and maintain two addresses may distort the averages by contributing to Medicare costs in one county and to the population count in another.
- o Persons who use Veterans Administration (VA) or military hospitals will not have their costs reflected in the AAPCC although they will be counted in the denominator of the average. There is a similar problem for those working aged who are covered by employer-sponsored health insurance. These phenomena may artificially lower the AAPCC in some counties.

## 2.2 Proposed Solutions

- a. Improve stability by averaging over 6 or 7 years instead of 5 years. Also consider dropping the highest and lowest years before averaging.

NOTE: M&R did a limited empirical study of these alternatives and concluded that they make no appreciable improvement.

- b. Adjust each year for demographic mix rather than adjusting once for all years combined to account for changes in the demographic mix over time.
- c. Adjusting for beneficiary migration: The issue should be studied to establish the magnitude of the problem.
- d. To adjust for high HMO penetration in areas where this is a problem, the geographic adjustor could be a blend between the historical county averages and changes in any one or a combination of (1) the USPCC, (2) FFS costs in low penetration areas which are otherwise similar, or (3) the averages for neighboring counties.
- d. The VA and military hospitals and working aged issues should be studied to establish the magnitude of the problem.

## 2.3 Panel Recommendations

### Recommendation 3:

Conduct studies to evaluate (1) possible changes to the present practice of equal weights in the 5-year average, (2) the impact of beneficiary migration, and (3) the impact of the VA/military hospital and working aged problems.

**Recommendation 4:**

**Adjust for demographics year-by-year in the 5-year average instead of a one-time adjustment.**

**If there is a trend toward a higher or lower average demographic factor in an area, this adjustment will make the payment more accurately reflect the current demographic mix.**

**Note:** No consensus was reached on how to approach the high penetration issue. Many on the panel felt that the problem required further research.

### 3. GEOGRAPHIC RECONFIGURATION

Currently the AAPCC is based on the county, a geographic unit chosen largely because it is traditionally the smallest area for which data are routinely compiled by HCFA. However, county boundaries are generally believed to be only loosely related to economic factors affecting health care costs. The University Health Policy Consortium in Boston is currently conducting a study of various methods to reconfigure AAPCC areas using aggregates of zip codes.

#### 3.1 Perceived Problems:

- o Unnecessarily large numbers - There are over 3,000 counties in the United States. A significantly smaller number of AAPCC areas should suffice.
- o Lack of homogeneity - Counties are not necessarily homogeneous with respect to Medicare FFS costs. Thus, if an HMO draws from a high cost part of the county, the HMO payment, which is based on the county average, will be too low. The converse will be true if the HMO draws from the low cost part of the county.
- o Boundary problems - Adjacent counties often have highly different AAPCCs. Such differences seem illogical to HMOs who draw enrollees from both counties and observe no cost differences relating to area of residence.

#### 3.2 Proposed Solutions

- a. Homogeneity - Two specific proposals for achieving greater homogeneity and fewer areas were proposed:
  - 1. Form areas based on urban core, suburban ring, and rural areas. This proposal is based on the theory that health care costs tend to decrease with distance from the center of metropolitan areas.

2. Aggregate contiguous 5-digit and/or 3-digit zip code areas into larger areas which are relatively homogeneous with respect to Medicare FFS costs.

NOTE: Some panelists noted that as Medicare payments move toward a national rate, e.g., the Medicare hospital prospective payment system (PPS), geographic variations in payments should decrease.

- b. Blending estimators - When many means are to be estimated, their overall stability can be improved using blending or shrinkage estimators. This should also serve to reduce boundary problems.

### 3.3 Panel Recommendations

#### Recommendation 5:

Continue the current study to redefine geographic areas that result in more homogeneous Medicare cost areas than the current counties. Two approaches warrant further development and evaluation:

- a. The urban core/suburban ring/rural model, and
- b. Aggregation of contiguous zip codes into homogeneous larger areas.

NOTE: A panelist observed that the geographic areas used for adjusting PPS payments to hospitals differ from the current and proposed areas for the AAPCC and that consideration should be given to making them the same.

#### Recommendation 6:

Study the impact of blending rates to improve stability, in conjunction with the geographic reconfiguration.

#### 4. BIASED SELECTION

An issue singled out for special attention is biased selection. Studies of Medicare HMO demonstration projects suggest that the current AAPCC factors do not adjust premiums sufficiently for differences in health status. The use of health status adjusters, with HMOs receiving lower capitation payments for healthier enrollees and higher payments for sicker ones, is seen as a mechanism for (a) protecting both the Government and HMOs from unfair losses, and (b) encouraging HMOs to enroll and retain sicker people. A health status model is currently being developed by the University Health Policy Consortium in Boston. It uses the diagnostic information from past hospital stays to adjust premiums.

##### 4.1 Perceived Problems

- o Evaluations of Medicare HMO demonstrations suggest that most HMOs enrolled a healthier than average population. It is not known to what extent this resulted from HMO behavior (e.g., selective marketing) and to what extent from enrollee behavior (e.g., the tendency of sicker than average persons to remain with their FFS physicians). It is also not known to what extent this pattern will continue in the future.
- o Disenrollment is another aspect of the problem. There is some preliminary evidence that Medicare HMO disenrollees were sicker than average. It is not known why this may have occurred, but it seems desirable that methods be developed to give HMOs incentives to retain sicker people, as well as to insure that HMO payments accurately reflect the characteristics of the HMO's enrollees. (It should be noted that many studies of the under age 65 population have found that disenrollees were healthier than average.)
- o High-cost cases are another source of concern, particularly among smaller HMOs. This concern may discourage HMOs from participating in Medicare. Reinsurance for catastrophic cases can be costly for small HMOs.

- o After these problems are studied and possible solutions developed, it is necessary to test the most promising models in demonstration projects. However, legislation currently under consideration would seriously restrict HCFA's ability to conduct such demonstrations. A bill recently introduced in Congress prohibits the Secretary of Health and Human Services from conducting capitation demonstration projects involving more than \$15 million in Medicare funds, unless Congress specifically authorizes each such demonstration by statute. The bill also prohibits payment of more than 95 percent of the AAPCC in any demonstration.

#### 4.2 Proposed Solutions

- a. Health status adjusters - The model most prominently mentioned in this regard is the diagnostic cost group (DCG) model developed by the University Health Policy Consortium (Boston and Brandeis Universities.) in which selected diagnoses from prior year hospitalizations are used to predict subsequent year costs. The models are currently being updated using post-PPS data. Results are expected in December 1987.

A second model, advanced by a panel member, Dr. Leonard Gruenberg, involves the use of an adjustment for the higher expected costs of the frail elderly. This proposal was made on the theory that the DCG model alone will not adequately adjust for the health status of the frail elderly and hence will not encourage HMOs to enroll this sub-group of the Medicare population. Since frailty is a more elusive concept than the fact of actual hospitalization, concern was expressed that this model, if implemented, might lead to gaming. Frailty is measured in a number of ways, including limitations of activities of daily living (ADL), instrumental activities of daily living (IADL), or the concept of nursing home certifiable persons, used currently in social HMO demonstration projects.

b. Controls on disenrollment - Three suggestions were proposed:

- (1) Improved regulatory monitoring of disenrollees.
- (2) Enrollee lock-in for 12 months following an initial 3-month trial period during which time monthly disenrollment is permitted.
- (3) Placing HMOs at risk for the FFS costs incurred by disenrollees for a specified period (e.g., 6 months) after disenrollment.

c. "Blend" approaches - To dampen the effect of biased selection and to lessen the incentive to avoid sicker people, approaches involving a blend of capitation with methods for recognizing extraordinary current costs were suggested:

- (1) A DRG type approach in which the HMO receives a prospective payment for each episode involving certain high costs conditions, to be defined by study. (Suggested by A. Enthoven.)
- (2) A blend of capitation payments with FFS reimbursement. (Suggested by J. Newhouse.) This would require HMOs to submit bills on a FFS basis. With this approach an HMO might receive 50 percent of the AAPCC and 50 percent of Medicare-approved FFS billings.
- (3) A reinsurance system for cases exceeding a cost limit. (Suggested by J. Cookson.) As proposed, an HMO would receive a percentage (say 80 percent) of Medicare-approved charges whenever Part A costs for a person exceeded a set amount (e.g., \$10,000) in a year.

4.3 Panel Recommendations.

**Recommendation 7:**

**Conduct demonstrations based on the DCG models.**

The panel felt this was the most promising approach yet developed to deal with biased selection. It would alter the AAPCC formula to include information about prior year hospitalizations.



**Recommendation 8:**

Demonstrate the DCG models in a variety of HMO settings to evaluate potential problems.

The panel felt that different HMO types (e.g., new versus long-established plans) might behave differently under a DCG model and that this was important to know.

**Recommendation 9:**

Link DCG demonstrations with Peer Review Organization (PRO) review activities.

The PRO would review the accuracy of the coding of hospital diagnoses, especially of diagnoses that result in high premiums the next year.

**Recommendation 10:**

During the demonstration, collect information not only on enrollees but on disenrollees.

Studies of Medicare HMO demonstration projects indicate that biases in who disenrolls may be as important as biases in enrollment.

**Recommendation 11:**

Evaluate the impact of the DCG approach on administrative costs.

Although the DCG approach may refine the AAPCC, the costs in terms of staff, data reporting, and other administrative overhead need to be studied.

**Recommendation 12:**

After the demonstration phase, if the DCG approach is implemented nationwide, consider a phase-in over several years to minimize impact on HMO revenues.

Some HMOs would find their revenues reduced under the DCG system. A phase-in will allow them time to adjust. One possible consequence of reduced revenues might be reduced supplemental benefits, as well as higher premiums or copayments.

**Recommendation 13:**

Continue the research phase of the DCG approach, especially to refine the cost groupings, to predict more than 1 year's costs, and to render the model less susceptible to gaming.

Suggested research should include simulations using data on actual HMO enrollees and a review of the DCG groupings by insurance company physicians. In addition, during demonstrations, there should be efforts to identify high cost groups not included in the DCG model, with a view toward revising the model to include them.

**Recommendation 14:**

Because of the importance of testing the DCG and other potential new refinements to the AAPCC, it is recommended that Congress not impose a blanket restriction on HCFA's ability to conduct capitation demonstrations. Without testing the DCG model and other refinements, there would be no knowledge of unintended consequences of changes to the AAPCC.

**Recommendation 15:**

Study the feasibility of using a "frail elderly" factor in conjunction with the DCG approach.

Frailty seems to be an important determinant of health care costs. Thus, the panel believed research should be continued on frailty as a possible adjustor. However, panelists expressed concern about whether a frailty adjustor would be practical to implement and whether it might be too gameable.

**Recommendation 16:**

Improve regulatory monitoring of disenrollees .

The panel devoted much discussion to disenrollment issues. They felt that the knowledge an HMO would have of enrollees' health once they enrolled would make purposeful gaming easier than biased selection at time of enrollment. The panel discussed capitation of primary care physicians for referral services as a possible perverse incentive to disenroll persons requiring costly services.

Further, biased disenrollment need not result from overt actions on the part of an HMO. The panel recommended improved monitoring of disenrollment. A minority of the panel felt that the difficulty (a) of defining specific problems in disenrollment and (b) of defining and implementing specific sanctions for them — would make monitoring of disenrollment by HCFA ineffective.

Because of the seriousness with which the panel views the disenrollment problem, two other measures were considered but not recommended in the end. They are:

- (1) There was a proposal for a 3-month trial period with monthly enrollment permitted, followed by a year lock-in. This proposal would lessen the opportunity of biased disenrollment, while still permitting Medicare beneficiaries who did not understand what HMO enrollment involved to leave within 3 months. Some panelists thought a lock-in was politically unfeasible. However, one panelist was strongly in favor of a 12-month lock-in without a trial period, pointing out that the Federal Employees Health Benefits Program has nearly 30 years experience with an annual lock-in. Others thought data on disenrollment patterns by length of time enrolled should be studied first to gauge the impact of a lock-in.
- (2) Another proposal was that HMOs be responsible for the FFS Medicare costs of disenrollees for a defined time after disenrollment. This would provide an incentive for HMOs to retain high cost people. The idea generated a lot of discussion but was rejected as probably unacceptable to the HMO industry. However, some panelists continued to see this as a potentially valuable approach which deserved further consideration.

No panel recommendation was made to deal with biased selection through payment systems that blend capitation with payments related to current use. Panel members representing the HMO industry felt that HMOs would not favor any approach other than full capitation. Although no consensus was reached on blend approaches, a number of panelists remained convinced that some form of these approaches were necessary to address some of the problems associated with a prepaid capitated system.

## 5. DEMOGRAPHIC FACTORS

The demographic factors currently used in the AAPCC to adjust premiums for differences in expected costs between HMO and FFS in the county are age, sex, welfare status, and institutional status.

### 5.1 Perceived Problems.

- o Welfare status - Welfare status is based on Medicaid eligibility. There may be State-by-State variations in this factor due to variations in eligibility requirements and to the fact that some States cover both the categorically and medically needy, while other States cover only the categorically needy. The categorically needy are persons who are eligible to receive cash payments under one of the existing welfare programs; the medically needy are not cash recipients, but are persons who fit into one of the welfare categories and have income and assets falling within the medically needy standards or who spend down to those standards.
- o Institutional status - HMOs must provide counts of their institutionalized enrollees; they state that this is difficult. In addition, the inclusion of institutional status creates perverse incentives, penalizing HMOs with programs to avoid institutionalization. Presently, counts of the institutionalized in a county are based on 1980 Census data. There was some question about how the data are updated.
- o Age - Age is divided into 5-year breaks. More cells, or a smoothed cost function, might improve accuracy.
- o Formerly disabled - Current factors do not differentiate between the aged who were or were not formerly entitled to Social Security Disability benefits, despite higher average costs for the formerly disabled.
- o The average underwriting weight is not 1.0. Although this poses no problem in terms of computation, it may present a problem in perception.

## 5.2 Proposed solutions.

- a. Welfare status - A separate category was suggested for the medically indigent.
- b. Institutional factor - There was substantial sentiment for elimination of the institutional factor, because of its perverse incentives. If retained, methods of reporting that are less burdensome on the HMO are needed.
- c. Age breaks - Various methods of smoothing or otherwise modifying the existing age breaks were suggested.
- d. Formerly disabled - A separate adjustment for aged enrollees formerly entitled to Social Security Disability benefits was proposed. However, if a model like the DCG model identifies chronic, high cost users, the need for a former disability adjustment may be reduced.
- e. Normalization of weights - To improve the way the public perceives the AAPCC, it was suggested that the demographic weights be normalized each year to sum to 1.0.

NOTE: Panelists observed that the issues related to the demographic factors would become less important if a DCG modification to the AAPCC were adopted.

## 5.3 Panel Recommendations.

### Recommendation 17:

**Adjust the demographic weights to sum to 1.0.**

This would not change the results of the AAPCC, but would remove a potential source of misunderstanding.

### Recommendation 18:

**Defer recommendation on the formerly disabled and on the elimination of the institutional factor pending the outcome of a Duke University study in which both of these issues are explored.**

Other than the Current Medicare Survey, which was used to compute the weights for the AAPCC, the 1982 and 1984 Long Term Care Survey is the only data base containing data on all four AAPCC factors (age, sex, welfare and institutional status) as well as former disability. The data are now being linked to Medicare claims. Then new weights will be computed for the four factors, as well as former disability. The project is scheduled for completion by January 1988.

**Recommendation 19:**

**If the institutional factor is retained, develop less onerous data collection methods for HMOs.**

Some options discussed included requiring institutions, rather than HMOs, to report to HCFA whenever HMO members are institutionalized, or to allow semi-annual or annual, rather than monthly reporting of institutionalized members. Another option would be to reinstate retroactive adjustments to the counts submitted by HMOs.

**Recommendation 20:**

**Document the data sources and assumptions used to determine the county-level institutional counts for the AAPCC.**

NOTE: The panel was interested in research on developing a more refined adjustor for welfare status which would distinguish between whether the basis for eligibility was categorically needy or medically needy. However, there is no national data base that identifies reason for eligibility for Medicaid recipients.

The panel concluded that the issue of changing the age breaks in the AAPCC was of minor importance.

## 6. OTHER ISSUES

Several other issues bearing on the AAPCC were discussed.

### 6.1 Perceived Problems

- o Premiums - Currently there are restrictions on the amount of the premium HMOs can charge Medicare enrollees. No premium is allowed for the basic Medicare package; the premium to cover deductibles and coinsurance is capped at the national average cost of these; and the premium to cover supplemental benefits must be based on the estimated value of these benefits. These restrictions may not leave room for the HMO to adjust for expected losses or for variations in the AAPCC from county-to-county which do not reflect HMO costs.
- o Impact of biased selection on the USPCC - To the extent that HMOs experience favorable selection that is not corrected for by the AAPCC, the USPCC will increase as more healthier-than-average beneficiaries leave the FFS sector.
- o Underserved areas - The AAPCC reflects costs and utilization practices in a county. Medicare beneficiaries in counties with historically low AAPCCs may have insufficient access to services. The low AAPCC discourages HMOs from coming into those areas because they cannot afford to operate there. Rural areas were particularly cited.
- o Areas with a high prevalence of Medigap coverage will tend to have a high AAPCC because of increased demand induced by low marginal out-of-pocket costs.

### 6.2 Proposed Solutions

- a. Flexibility in setting premiums - To offset anomalies such as large annual variations and across border variations, HMOs should be allowed to charge supplemental premiums for the basic Medicare benefits package. Premiums should also be allowed to vary by geographic area.

- b. Bias in the USPCC - Two suggestions were offered:
  1. Adjust the USPCC to reflect a standard population based on demographic factors currently in use as well as any health status adjustors as they come into use.
  2. Study the impact of HMO penetration on FFS costs. Compare the annual growth in the AAPCC in areas that have experienced high HMO penetration with growth in the AAPCC areas with low HMO penetration.
- c. Underserved areas - If the capitated payments were not restricted to reflecting Medicare payments in the FFS sector, payments could be based on different factors, such as the cost of providing services in an area.

### 6.3 Panel Recommendations

#### **Recommendation 21:**

**Eliminate current restrictions on premiums that an HMO may charge when there are at least two Medicare risk contractors in a given area or when some other criterion for the existence of competition is met.**

Many on the panel felt that HMOs should be allowed to set whatever premium the market would allow so long as the market was competitive. Also, it seemed illogical to let the AAPCC, but not the premium, vary by county.

NOTE: Although a majority of the panel favored this recommendation, a minority expressed concern that removing these restrictions could be detrimental to the beneficiaries. For example, beneficiaries enrolled in the HMO for several years would be reluctant to leave even in the face of an unjustified increase in premium. One panelist felt that the current restrictions on premiums should be waived only when the AAPCC was less than the adjusted community rate. Another panelist felt that the restrictions on the premium could be liberalized if subject to a maximum.



**Recommendation 22:**

**Adjust the USPCC each year to reflect a standard population.**

This recommendation was intended to correct for the possibility of an ever increasing USPCC if HMOs consistently have lower risk enrollees and favorable selection.

NOTE: Staff discussions with the HCFA Chief Actuary indicate that the current USPCC calculation may address part of this concern because the USPCC calculation does include both FFS and HMO costs.

**Recommendation 23:**

Given the extent to which many of the factors addressed in this report interrelate, **study the interaction of simultaneous multiple changes.** The total effect of several simultaneous changes may be different from the sum of the individual effects.

No consensus was reached on what to do about underserved areas or the Medigap problem. Some felt that these are not problems that can or should be solved by the AAPCC. Others expressed some sentiment toward setting the AAPCC above FFS levels in underserved areas to encourage an adequate level of service.

## APPENDICES

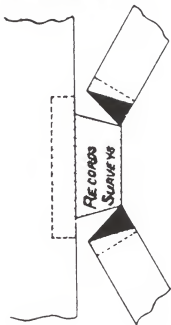
- A. AAPCC Study Panel and Other Participants
- B. Milliman and Robertson Report, "Actuarial Review of the AAPCC Methodology"
- C. Paper on AAPCC Geographic Reconfiguration
- D. Paper on Proposals for Changing the Way Medicare Pays HMOs
- E. Memorandum from Dr. Leonard Gruenberg on "Health Status Adjustments to the AAPCC"
- F. Memorandum from Dr. Harold Luft on "Geographic Units"
- G. Memorandum from Karen Wintringham on "Proposed Recommendations on Revising the Institutional Status Factor for the AAPCC"
- H. Minutes of Panel Meetings

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APPENDIX A.

AAPCC STUDY PANEL AND OTHER PARTICIPANTS

AAPCC STUDY PANEL AND OTHER PARTICIPANTS

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APPENDIX B.

MILLIMAN AND ROBERTSON REPORT

Actuarial Review of  
the AAPCC Methodology

July 26, 1987

Contract Number 500-86-0036 Task Order 004  
Subcontract Agreement #500-86-0036/004

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## 1. Executive Summary

Milliman & Robertson, Inc. has been engaged by the Circle, Inc. under a contract with HCFA to perform an actuarial review of the AAPCC Methodology for Implementing Prospective Contracts with HMOs. This section highlights the major conclusions and recommendations of our report. We have heavily relied on our professional judgment and expertise. We have attempted to recognize time constraints, administrative feasibility, and cost considerations in our recommendations.

As developed later in the report, the major purposes served by the AAPCC can be summarized as follows: (1) development of an equitable payment schedule, (2) maintenance of quality care, (3) creation of health care delivery environment which favors neither HMOs nor fee-for-service providers, and (4) generation of Medicare program savings. No AAPCC mechanism will accomplish all of these purposes for all HMOs. The AAPCC, therefore, should be developed to maximize the achievement of these goals in as many areas and for as many HMOs and as many Medicare beneficiaries as possible. To this end we have set forth specific criteria for evaluating proposed AAPCC enhancements or modifications. These criteria are important in determining whether proposed enhancements to the AAPCC will be worth pursuing.

### A. AAPCC Enhancements -- Current AAPCC Approach and Parameters

With respect to the current AAPCC we have the following recommendations:

1. USPCC -- Comparison with recent estimates indicates that the Part A USPCC values are within a reasonable tolerance when compared to current estimates. However, the Part B USPCCs for 1986 and 1987 contain substantial deviations from current cost estimates and are a cause for concern. One solution to the problem would be to require full annual disclosure of the USPCC development and to adjust the timing of data analysis to coincide with the USPCC development. If the accuracy cannot be improved it may become appropriate to include adjustments for past errors in future USPCC estimates.

2. Geographic Adjustment -- The stability of the geographic index can be tested using a least squares system of equations by county size classes to develop appropriate weighting factors by duration. We also suggest several alternative approaches which can specifically illustrate the trade off between accuracy and stability. Furthermore, yearly changes that appear anomolous should be investigated for data problems and fixed, if appropriate. A second issue with respect to the geographic adjustment is the impact of the DRG factor. It was not possible to fully investigate the impact of this adjustment without further explanation by HCFA concerning their approach and methodology. Also, the problems with snow birds and proper geographic coding of enrollees should be more fully investigated and corrected.
3. Demographic Factor -- A single set of Medicaid demographic factors for all states is necessarily inaccurate because of the significant variation in covered member classifications among the state Medicaid programs. One possible adjustment would be to separate the cost categories for the Medicaid medically indigent and other Medicaid enrollees. It is possible that the latter category could be combined with the non institutionalized non-Medicaid category, assuming their cost factors were relatively close. A second adjustment in the demographic factor would involve a simple normalization of the demographic factors to 1.0 for the total U. S. each year.
4. Non HMO Per Capita Costs -- An analysis of the non HMO per capita cost development step of the AAPCC indicates there may be a number of problems in the calculation performed to remove HMO costs from total costs by area. We believe the results shown in Appendix D of this report should be reviewed by the HCFA actuaries to determine if there are problems in this step.
5. Working Aged -- HCFA's assumptions that national average percentages of working aged persons will enroll in each HMO leads to inaccuracies in payment. A separate demographic category could be developed for working aged persons, thus eliminating the guesswork about the proportion of working aged persons in each HMO.

6. Prior Disability Adjustment -- The utilization levels of persons who are previously disabled and turn 65 is higher than the balance of the enrollees over 65 who have not previously been disabled. An adjustment to recognize this situation is appropriate. However, it may be unnecessary if the DCG approach proposed by Ash and reviewed later in the paper is appropriate.
7. VA Issues -- The presence of VA facilities in an area could potentially understate the AAPCC for HMOs in the service area. We recommend a study be developed using existing data to determine if the presence of VA facilities affects the resulting AAPCCs.
8. Documentation -- Much of the confusion in the industry about the AAPCC centers around the lack of documentation. Enhanced documentation of the AAPCC process which could be provided to individual HMOs and the HMO industry in general would substantially increase the understanding of the AAPCC process and remove the "blackbox" nature of the calculation.

B. AAPCC Enhancements - Redefining the AAPCC

With respect to enhancements to the AAPCC we have the following recommendations:

1. Accuracy -- The coefficient of variation should be used as a statistical measure in determining the homogeneity of risk cells in the AAPCC. This should include an analysis of homogeneity of future risk classifications developed from historical enrollee data in all future proposed enhancements. Also, all factors should be controlled when developing the revised factors. For example, the geographic, demographic and prior use factors are not independent.
2. Geographic Issues -- As part of the current research into 3 digit zip codes, we recommend that the Zip Code Sectional Area System be investigated as a possible classification system and that a modification of the urban core suburban ring proposals be analyzed in conjunction with this approach.
3. Health Status/Prior Use Adjustments -- We recommend that the Diagnostic Cost Grouping approach to prior use be pursued as very promising. However, we also propose that several modifications be studied as part of the update to this analysis, using post-PPS data. Hopefully, this adjustment will eliminate the need for institutional and welfare categories in the future.
4. High HMO Penetration -- We recommend the consideration of a blend of the following trends to be used in the AAPCC update for high HMO penetration areas: a) the USPCC increase, b) the increase in costs of non-HMO enrollees in all high HMO penetration areas and c) the increase in the AAPCCs of neighboring areas.
5. As it is currently structured the AAPCC would probably discourage development of HMOs in areas of unmet needs. This should be recognized as a byproduct of the level playing field objective.

## II. Introduction

Milliman & Robertson, Inc. has been engaged by The Circle under a contract with HCFA to perform a study of improving the accuracy of the AAPCC Methodology for payment to contracting organizations (referenced as HMOs in the balance of this report, for simplicity) under risk contracts. The issue of developing Medicare rates for prospective contracts with HMOs is an important one, in light of the growing role of HMOs and the continued escalation of health care costs. It is also an issue which raises concern among public officials and differences of opinion among various individuals involved with the HMO sector. This report represents an objective evaluation of a number of these issues.

The Adjusted Average Per Capita Cost (AAPCC) is a measure of the average cost to the Medicare program in a particular locale of providing coverage to Medicare beneficiaries under Title XVIII of the Social Security Act. It is a representation of the level of cost to Medicare, by demographic category, of the average amount that HMO enrollees would have cost in the fee-for-service sector of the geographic area. The AAPCC is developed by HCFA actuaries for use with contracting organizations which have elected a risk contract. It is in the form of a rate book, which facilitates the application to different enrollment distributions.

The determination of an AAPCC involves the application of a set of actuarial techniques and procedures to a collection of data sources. The nature of the available data sources and time considerations necessarily have a significant effect on the actuarial procedures employed. The synthesis of data sources available, actuarial techniques, and application constraints should be based on actuarially sound methodology and reasonable assumptions with the objective of producing reasonably accurate results in a consistent fashion over time.

The purpose of our review is an examination of the AAPCC methodology for payment under prospective risk contracts and, where appropriate, the identification of any needed modifications. The primary objectives of this review are as follows:

- Identify a set of criteria which can be used to evaluate potential enhancements to the AAPCC

- Identify and evaluate potential enhancements to the AAPCC
- Address a number of specific issues regarding parameters included (or omitted) and approaches taken under the AAPCC methodology.

Because of the nature of the undertaking, the limited time span for completion, and limitations on access to detailed data, our conclusions concerning many of the relevant issues rely on professional judgment rather than empirical studies. The material which follows is the result of our examination of the AAPCC methodology for implementing prospective contracts with HMOs. It is divided into three additional sections. Section III provides a general overview of the risk-basis AAPCC under TEFRA. Section IV contains a technical evaluation of the current actuarial methodology. Section V includes an analysis of the major issues regarding a future AAPCC approach. Also attached are Appendices A-E that support and elaborate upon our comments, suggestions, and conclusions. Appendix F contains a bibliography of papers and other documents used as background references.

The team assembled for this review included John P. Cookson, F.S.A., Ronald G. Harris, F.S.A., Earl L. Whitney, F.S.A., Joseph N. Romano, A.S.A., and Eileen A. Kurtz, M.S. All of the actuaries involved in the team have extensive health insurance experience as well as substantial experience with HMOs. In addition, the team brings direct and substantial experience with the Medicare program. We have also relied upon some background material developed in our previous report to HCFA "Review of AAPCC Methodology for Implementing Prospective Contracts with HMO's" dated November 3, 1983. Our previous report also goes into considerably more detail on the actual mechanics of the AAPCC formula for anyone who is interested.

### III. Overview

Section III of the report has been substantially reproduced from our report to HCFA of November 3, 1983, (Cookson<sup>(1)</sup>). Adjustments have been made to reflect only subsequent program changes.

#### A. Medicare Payments to HMOs

Section 1876 of the Social Security Act permits payments by Medicare for covered services provided to Medicare enrollees by participating HMOs. It authorizes two alternative methods of payment: (1) cost-based reimbursement and (2) risk-basis payment. Under cost-based reimbursement, interim payments are made to an HMO on a per capita basis, with subsequent adjustments to reflect a retrospective determination of actual HMO costs (based on audited cost reports). Such arrangements are outside of the scope of this study. Under a risk-basis contract, payments are made to an HMO on the basis of prospectively determined per capita rates. No retrospective cost determinations or adjustments in payment are contemplated. An HMO may elect a risk-basis contract or a cost reimbursement contract (subject to minimum size and other criteria for risk-basis contracting).

A risk-basis payment arrangement, as established in Section 1876 and revised by TEFRA, involves per capita payments to an HMO on a prospectively determined basis. It specifies that the Secretary of HHS will establish a system of classification for Medicare-eligible HMO members covered under risk-basis contracts, and it defines the "Adjusted Average Per Capita Cost" (AAPCC) which forms the basis for the per capita payments. The Secretary is required to define "appropriate classes of members, based on age, disability status, and such other factors as the Secretary determines to be appropriate, so as to ensure actuarial equivalence." He may add to, modify, or substitute for such classes if such changes will improve the determination of actuarial equivalence. The statutory definition of the AAPCC is that it represents the average per capita amount which the Secretary "estimates in advance" for the geographic area served by the HMO.



The Medicare payment for each class is set at 95% of the AAPCC for that class. If this payment level exceeds the HMO's adjusted community rate, the HMO must return the difference to enrolled Medicare members in the form of a reduction in the premium charged for coverage of the Medicare copayments or in the form of additional benefits; alternatively, it may be returned to Medicare in the form of a reduced Medicare payment.

An annual open enrollment period with a duration of at least 30 days must be held. The HMO must accept all applications on a first-come, first-served basis, and it may not expel members because of health status or requirements for health care services. An individual may terminate enrollment by advance notice. The HMO may not refuse to re-enroll any such individuals because of health status or requirement of health care services. All individuals enrolled under Part B of Medicare, other than individuals medically determined to have End-Stage Renal Disease (ESRD), are eligible to enroll in an HMO which serves the geographic area in which the individual resides.

The selection of existing Medicare enrollees to convert from a cost to a risk-basis "shall be made in a nonbiased manner." In addition, any existing cost-based Medicare member who converts to a risk-basis contract must request such a transfer. Alternatively, the Secretary may determine that the new risk-basis contract should apply to all Medicare enrollees in the HMO because of excessive administrative burden. An HMO which has an existing risk contract with Medicare may, at its election, continue on such a contract for as long as five years.

B. Adjusted Average Per Capita Cost

The adjusted average per capita cost (AAPCC), as specified in Section 1876, is an estimate of the average cost of Medicare services for a group of similarly classified Medicare eligibles in a geographic area, excluding individuals enrolled in an HMO. The Secretary is responsible for developing a classification system for this purpose, in order to assure "actuarial equivalence." The intent is that the AAPCC represent the actuarially equivalent average or expected cost of providing Medicare benefits to HMO members in each defined class if such members had not been enrolled in an HMO. Therefore, the AAPCC represents, in effect, a rate book of values, one for each defined class.

The calculation of a set of AAPCC values can be described conceptually in terms of four basic steps. They are as follows:

1. Projection of the national average Medicare per capita cost (USPCC) for an HMO's contract year -- by Medicare enrollment status, separately for Part A and Part B. The USPCC includes a loading for administrative costs.
2. Determination of county geographic adjustment factors, which reflect the historical relationships between Medicare cost per capita in each county of an HMO's service area and the entire United States, adjusted to reflect Medicare reimbursement characteristics in the year for which the AAPCC is calculated.
3. Estimation of county non-HMO average per capita cost for an HMO's contract year -- by Medicare enrollment status, separately for Part A and Part B.
4. Calculation of county AAPCC values for an HMO's contract year -- reflecting Medicare enrollment status and demographic variables, separately for Part A and Part B.

This process is nearly identical, with the exception of minor changes due to TEFRA, to that described previously by Kunkel and Powell<sup>(2)</sup>.

#### IV. AAPCC Enhancements - Current AAPCC Approach and Parameters

##### A. Major Purposes of the AAPCC

The major purposes served by the Adjusted Average Per Capita Cost (AAPCC) can be described as follows:

1. Development of an Equitable Payment Schedule. The AAPCC rate book should bear some resemblance to what HMO members would have cost Medicare had they not been members of the HMO, under current law and regulations. This includes both the level of the aggregate payment in a county and the relationship of the individual rate cells within the rate book for a particular geographic unit.
2. Maintenance of Quality Care. The AAPCC should not be so low that it would reduce the chances that a contracting organization would provide quality care to its Medicare members. It is, therefore, very important for contracting organizations to carefully evaluate the level of the AAPCC payment in their service areas before contracting with Medicare on a risk basis.
3. Create a health care delivery environment which favors neither HMOs nor fee-for-service providers, thus enhancing the number of "fair choices" which Medicare enrollees will have in deciding where to seek health care. The AAPCC should be established in such a way that it enhances a competitive environment, without providing any advantages for either the HMOs or fee-for-service sector. Thus, if fee-for-service health care delivery in a particular area is inefficient and if HMOs can deliver medical care more efficiently, then HMOs should be able to compete effectively. Conversely, if fee-for-service health care delivery in an area is relatively efficient, this will make it much more difficult for the HMOs to compete effectively.

4. Generation of Medicare Program Savings. The AAPCC should be developed in a way that, as a minimum, does not increase the long term cost of providing medical care under the Medicare program. Effecting this goal could conceivably require short term increases in program costs to achieve longer term savings.

No AAPCC mechanism will accomplish all of these purposes for all HMOs. The AAPCC, therefore, should be developed to maximize the achievement of these goals in as many areas, for as many HMOs, and for as many Medicare beneficiaries as possible.

B. Evaluation Criteria for AAPCC Enhancements

The following criteria have been identified to evaluate the current AAPCC and any proposed changes to the AAPCC:

1. The Existence of Bias. The AAPCC should be structured such that an organization cannot take advantage (or determine the existence) of a bias in the payment methodology to increase its profit under the Medicare program. Taking advantage of such a bias would presumably result in windfall gains which would not normally occur under a more accurate payment methodology. Thus, every variable in the Medicare rate book should enhance its accuracy and not be subject to gaming due to bias.
2. Simplicity and Understandability. Much of the current confusion over the AAPCC has resulted from misunderstandings about both the purposes and the operational aspects of the AAPCC. The AAPCC should be conceptually simple and understandable to the organizations who have their payment based upon the AAPCC. This will be greatly enhanced by increased disclosure of the AAPCC calculation process. A sample calculation of an AAPCC that could be used as a basis for disclosure of inputs in the current process is shown in Appendix E.
3. Stability. Changes in each area's AAPCC from year to year should be limited to a minimal level of random variability. Recently there has been considerable instability in the AAPCC due to theoretical as well as more practical considerations. This will be described in more detail later.
4. Practicality. The AAPCC should be a practical mechanism for developing rates. The development should be consistent from year to year and be from data sources which are maintained by the Health Care Financing Administration on an ongoing basis. Additional data systems may need to be developed in order to enhance the AAPCC.

5. Data Availability. Possible enhancements to the AAPCC should not be limited to existing data within the Health Care Financing Administration. Certainly, any immediate improvements in the AAPCC need to focus on current data availability. However, creating a more equitable payment structure which meets the criteria set forth in this paper, may require the development of additional data within the Health Care Financing Administration.
6. Potential for Abuse. The AAPCC should be developed so as to minimize possible abuse under the system. If abuse can occur, we prefer that it be limited to types that are easily deductible through monitoring systems. This type of abuse can be more easily corrected as necessary.
7. Favorable Selection and Anti-Selection. Much concern has been expressed over the enrollment by HMOs of healthier than average Medicare members. Any approach to solving this potential problem should be careful to consider both favorable selection and anti-selection. It should also recognize the potential offsetting effects of regression toward the mean (Beebe<sup>(3)</sup>, Welch<sup>(4),(5)</sup>). The regression toward the mean phenomenon indicates that under certain conditions, decreased cost of medical services caused by favorable selection and the increased cost of services caused by anti-selection tend to be substantially reduced within 1 to 2 years, although it may not be completely eliminated for quite some time, if ever. Therefore, analysis of the selection problem is more complex than simply reviewing the pre-enrollment costs of new HMO members.
8. Effect on the Current Market. Any potential improvements to the AAPCC should be evaluated to determine the effect that they will have on the current Medicare Risk Contract marketplace. It is possible that an idea which has strong theoretical appeal would have a substantial cost/revenue impact on the current risk contracts. That is, AAPCC payments to some providers could dramatically increase or decrease. Such potentially disruptive effects on the market should at least be understood in advance and avoided, if possible. It may be advisable, in the interest of stability and continuity of the program, to phase in major changes over some time period.

9. **Future Viability of Risk Contracting Organizations.** The risk to HMOs in contracting with Medicare on a risk basis has increased in each of the last two years, and is likely to continue to increase in future years. This results primarily from the fact that the government can unilaterally reduce or freeze Medicare payment levels which reduce the AAPCC. HMOs cannot collectively respond in a counter-balancing way. It will therefore likely become increasingly difficult each year for any given HMO to continue to contract with Medicare. Furthermore, it is possible that some of the proposed modifications to the AAPCC will make it much more difficult for HMOs to operate under a risk contract. The viability of organizations to contract with Medicare should be carefully considered under any new proposed AAPCC methodology.
10. **Prospective and Retrospective Changes.** Current law indicates that the AAPCC should be a prospectively determined rate book. However, it might be appropriate to incorporate some retrospective elements into the AAPCC to improve the process. Such retrospective adjustments to the AAPCC should be considered in the overall evaluation of enhancements to the AAPCC.
11. **Required Changes in Law or Regulation.** Proposed enhancements to the AAPCC should be evaluated to determine whether legislative or regulatory changes are required to implement the AAPCC. The Office of the Actuary in HCFA currently has wide latitude in determining which changes to the AAPCC should be effected. However, some changes may require regulatory or legislative change. The time involved in making such changes makes it necessary to include this in the evaluation criteria for any proposals.
12. **Cost to the United States Government.** Any proposed change in the AAPCC methodology should be evaluated with regard to its effect on Medicare program expenditures. Such evaluation may necessarily need to be subjective in nature. It may be impossible to precisely quantify the amount of cost or savings, but it may be possible to determine whether costs would increase or decrease. In this time of tight budgetary constraints it is possible that an enhancement to the AAPCC (which may be theoretically correct and desirable) which would increase Medicare's costs may be rejected for that

reason. However, it is important in evaluating the cost to the Medicare Trust Funds to determine the long term financial impact as well as the potential short term budgetary impact of such enhancements.

13. **Timing.** In evaluating a potential enhancement to the AAPCC, worthwhile ideas can be pursued in a number of ways. Some changes could be effected immediately through a change to the AAPCC methodology by the HCFA Office of the Actuary. Other ideas can be pursued via a Medicare demonstration site or multiple Medicare demonstration sites. A third alternative is to review data for existing Medicare contractors to measure the effect of the proposed changes. This approach is likely to be less costly and time consuming than pursuing the Medicare demonstration route for many proposed changes. Finally, many proposals are impractical under current circumstances and should not be pursued. If circumstances change in the future it may be worthwhile to pursue these ideas at that time.

The above evaluation criteria are very important in determining whether proposed enhancements to the AAPCC will be worth pursuing. In the remainder of this paper, we review the various components of the AAPCC as it currently exists, and evaluate proposed enhancements to the AAPCC.



C. AAPCC Approach and Parameters

1. General

The AAPCC has been considered conceptually in terms of the formula below by Whitney and Romano<sup>(6)</sup>:

$$\text{AAPCC} = 95\% \times \text{USPCC} \times \frac{\text{PGA} \times \text{DRG}}{\text{DF}}$$

USPCC = the United States Per Capita Cost

PGA = the 5 year average pure geographic adjustment, unaffected by the DRG factor. (Note: PGA cannot be computed directly for Part A).

DRG = the impact of the DRG adjustment on PGA to obtain the actual geographic adjustment (GA) used. That is,  $\text{DRG} \times \text{PGA} = \text{GA}$ .

DF = the average demographic factor for Medicare members in the county.

The illustrations in Charts 1 and 2 demonstrate the change for each factor. As can be seen in these two examples, the change in USPCC and the DRG adjustment generally have the greatest impact on change. The impact of the other components is relatively minor compared to these two factors.

It is also worth noting, as discussed in Whitney and Romano<sup>(6)</sup>, that the 95% figure can be misleading. In fact, if an HMO requires 10% of revenue for administrative expenses, only 87% ( $95\% \times 90\% = 98.5\%$  where the 90% is the HMO revenue net of expenses and the 98.5% is the AAPCC net of expenses) of the Medicare fee-for-service cost is available, net of administrative expenses, to support its medical care costs. As further illustrated in this same source, an HMO may be required to effect combined utilization reductions, provider discounts, and benefit reductions of 30% to 40% of normal fee-for-service charges in order to break even under a Medicare risk contract.

The remainder of this section reviews numerous aspects of the current AAPCC calculation process and makes some practical recommendations regarding this process.

Chart 1  
Illustration of AAPCC Component Changes - Aged Enrollees  
Delaware County, Pennsylvania

	<u>Part A</u>	<u>Part B</u>	<u>Total</u>
1986 AAPCC	\$167.00	\$80.08	\$247.08
1987 AAPCC	\$159.16	\$90.79	\$249.95
Gross Increase in AAPCC	-4.7%	13.4%	1.2%
1986 AAPCC Rank <sup>(a)</sup>	95	84	66
1987 AAPCC Rank <sup>(a)</sup>	148	57	69
Change due to:			
(1) AAPCC Payment Percentage	0.0%	0.0%	
(2) USPPC	1.2%	10.8%	
(3) Pure Geographic Adjustment	-1.4%	2.0%	
(4) DRG Adjustment	-4.9%	--	
(5) Demographic Factor	0.2%	0.1%	
(6) Residual <sup>(b)</sup>	0.2%	0.2%	

Notes:

- (a) Rank of Delaware County AAPCCs relative to all 3,143 counties in the United States (1 = highest; 3,143 = lowest)
- (b) Residual change in the AAPCCs, due to factors other than the 5 components listed.

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(4) DRG Adjustment	-4.9%	--	
(5) Demographic Factor	0.2%	0.1%	
(6) Residual <sup>(b)</sup>	0.2%	0.2%	

Notes:

- (a) Rank of Delaware County AAPCCs relative to all 3,143 counties in the United States (1 = highest; 3,143 = lowest)
- (b) Residual change in the AAPCCs, due to factors other than the 5 components listed.

Chart 2  
Illustration of AAPCC Component Changes - Aged Enrollees  
Kings County, New York

	<u>Part A</u>	<u>Part B</u>	<u>Total</u>
1986 AAPCC	\$167.05	\$89.56	\$256.61
1987 AAPCC	198.52	100.88	299.40
Gross Increase in AAPCC	18.8%	12.6%	16.7%
1986 AAPCC Rank (a)	93	35	42
1987 AAPCC Rank (a)	13	27	11
Change due to:			
(1) AAPCC Payment Percentage	0.0%	0.0%	
(2) USPCC	1.2%	10.8%	
(3) Pure Geographic Adjustment	.3%	2.3%	
(4) DRG Adjustment	17.3%	--	
(5) Demographic Factor	.3%	.7%	
(6) Residual (b)	-.5%	-1.3%	

Notes:

- (a) Rank of Kings County AAPCCs relative to all 3,143 counties in the United States (1 = highest; 3,143 = lowest)
- (b) Residual change in the AAPCCs, due to factors other than the 5 components listed.

2. The United States Per Capita Cost (USPCC)

General

The USPCC is the starting point for the calculation of all AAPCCs. Separate USPCCs are calculated for Part A and Part B, for aged, disabled, and ESRD Medicare enrollees. There are, therefore, 6 USPCCs for each calendar year.

In developing the USPCC, costs are accumulated for all Medicare enrollees, regardless of whether they reside in the United States or not. In order to maintain consistency in the AAPCC calculation, the geographic adjustment represents the ratio of per capita cost for the enrollees in the particular geographic area for which the AAPCC is being calculated, divided by the per capita cost in all areas. This "all areas per capita cost" includes all Medicare enrollees in a manner similar to that used in the USPCC calculation.

Sources of Error in the USPCC

The USPCC is potentially one of the greatest sources of error in the AAPCC calculation because it is the major determinant of the level of government payment to HMO Risk Contractors in a given year. If the USPCC is estimated 5% lower than the actual cost, for example, the federal government has saved 5% of the fee-for-service costs for the HMO enrollees.

The USPCC is calculated from the most recent set of actuarial assumptions available in the Office of the Actuary at the time the calculation is made. The HCFA actuaries annually "reconstruct" historical claims experience through an actuarial technique which is termed claims lag analysis or triangulation. This technique analyzes historical claims payment patterns for services incurred in a particular period in an effort to determine the proportion of claims incurred in a more recent period which remain unpaid as of the date of the analysis. The process is subject to error when interruptions in claims flow or differences in claims patterns emerge over time. This is particularly important in recent years in that annual revisions to the Medicare program have created an environment in which claims lag analysis has become much more difficult and subject to error.

In order to substantiate the estimates developed through the claims lag analysis, the HCFA actuaries compare estimated cash outlays against those actually paid by the Treasury department for the Medicare program. Adjustments to the estimates are then made in order to more closely match these cash outlays. This second method is important in that it creates a somewhat independent check of the estimates developed from the claims lag analysis.

The accuracy of any USPCC or other per capita cost estimate will be reduced with increasing elapsed time between its effective date and the most recent historical reconstruction of claims (the projection period). An estimate of projected claims per capita is likely to be more accurate if the historical reconstruction has just been completed than if it were performed many months prior to when the estimate is developed. The longer the projection period the greater the impact of future assumed trends, with increasing uncertainty, in the USPCC estimate.

Our understanding is that the USPCC calculation is performed just prior to the development of the historical reconstruction of claims by the HCFA actuaries. Therefore, the current USPCC calculations are based on a historical reconstruction which is from nine to eleven months old at the time of the calculation. We believe that the accuracy of the USPCC would be enhanced if the historical reconstruction were performed just prior to the calculation of the USPCC.

The trends assumed in projecting the historical experience to the USPCC estimates also represent a substantial source of error. Our understanding is that the input to developing the trends is substantially influenced by the economic assumptions provided by the Administration. It is unclear whether the potential policy bias inherent in the economic assumptions can be eliminated in the HCFA actuaries' trend projection model.

The development of good trend estimates is an area which has plagued the health insurance industry for many years. It is, perhaps, one of the most difficult estimates which an actuary is called upon to perform and is a blend of art and science. In order to be as accurate as possible, it is important that the projection of trends used in the development of the USPCC be independent of policy bias and that as many of the relative factors (economy, provider changes, etc.) as possible be considered.

Another factor which has a substantial effect on the level of the USPCC calculation is the estimated cost or savings to the Medicare program which result from proposed regulatory or administrative policy changes adopted for purposes of the annual budget reconciliation process. For the last two years substantial savings have been projected as a part of this process. The HCFA actuaries include in the USPCC any estimates of savings or cost which are expected to occur in the period for which the USPCC is calculated. It is generally very difficult to determine the extent to which the proposed regulatory or administrative policy changes will actually be implemented or to which these savings estimates are accurate. If the assumptions are overly optimistic they will result in a USPCC which is below true expected costs. Conversely, if the estimates are too pessimistic, the resulting USPCC will be too high.

Charts 3 and 4 compare annual per capita costs per aged Medicare enrollee under various estimates developed by the HCFA actuaries. All of the information presented in these charts is available from published sources or other sources available to the public.

The comparisons made include the costs of aged ESRD enrollees in all cases in order to minimize the estimation error which would result in removing the costs of these enrollees. The numbers labeled as USPCCs are, therefore, not directly the annualized USPCCs because of the inclusion of the aged ESRD enrollees in the total. This should have little impact on the comparisons made.



Chart 3  
Comparison of Various Part 8 Aged Enrollment And Per Capita Values

Time Period	Action or Report Source	Aged Per Capita Values (1)					Aged Average Enrollment Values (1)				
		1984	1985	1986	1987	1988	1984	1985	1986	1987	1988
7/18/84	OEFA passed						-	-	-	-	-
9/28/84	1985 Premium Promulgation	\$674.16	\$766.56	-	-	-					
	1985 USPPC/AAPCC		\$723.72								
11/84-12/84	Reconstruction										
12/12/85	Physician Fee Freezes + Gramm-Rudman						-	27.337	28.027	28.666	-
3/28/85	1985 Trustees Report	-	\$715.88	\$796.26	\$885.43	-					
7/85-8/85	Mini Reconstruction								28.027 (3)		
9/23/85	1986 USPPC/AAPCC			\$779.83 (2)			-	-	-	-	-
9/30/85	1986 Premium Promulgation	\$646.32	\$704.64	\$781.20	-	-					
11/85-12/85	Reconstruction						26.674	27.237	27.872	28.468	29.030
3/31/86	1986 Trustees Report	\$651.47	\$735.78	\$847.08	\$945.52	\$1,042.19					
4/ 7/86	COBRA										
7/86-8/86	Mini Reconstruction									28.666 (6)	
9/ 6/86	1987 USPPC/AAPCC	\$652.73 (4)			\$865.62 (5)		-	-	-	-	-
10/ 2/86	1987 Premium Promulgation	\$660.24	\$732.00	\$813.36	\$903.36	-					
10/21/86	OBRA										
11/86-12/86	Reconstruction						26.674	27.184	27.762	28.358	28.924
3/30/87	1987 Trustees Report	\$658.74	\$735.53	\$857.70	\$984.61	\$1,102.79					

See Footnotes on following page.

Chart 3 ( Continued )

Law Changes		Footnotes	
Law	Major Items Affected	Number	Comment
DEFRA	Medicare Secondary 65-69 workers and spouses Lab Fee Schedule at 60/62% of prevailing Physician Fee Freeze to 10/1/85  Net Impact: Savings?	(1)	All information, unless noted, taken from the Trustees Reports of 1985, 1986, and 1987, Appendix A Table A7, and Appendix 8 Table 3. Populations are shown in millions.
Misc	Physician Fee Freeze extended 1% reduction in payments  Net Impact: Savings?	(2)	From the 1986 USPPC, adjusted to reflect removal of the administrative loading and the addition of Aged ESRD. 1987 is $((\$66.01/1.031)*12*(28.027-0.035)+\$350)/28.027$
COBRA	Physician Fee Freeze extended to 4/30/86 Calendar year Fee screens Medicare Secondary to 65+ workers and spouses  Net Impact: Savings?	(3)	Assumed to be the same as the 1985 Trustees Report.
OBRA	Economic Index set at 3.2% (96% of Prevailing for Non-Participating) Prevailing Charge reduced on cataract surgery Vision care covered by optometrist Medicare Secondary for disabled  Net Impact: Cost?	(4)	From the 1987 USPPC background worksheets, adjusted to reflect removal of the administrative loading and the addition of Aged ESRD. 1984 is $((\$55.17/1.031)*12*(26.674-0.027)+\$300)/26.674$
		(5)	From an OACT presentation at a GHAA Conference.
		(6)	From an OACT presentation at a GHAA Conference.
			Mini Reconstructions use data through 4th quarter of the preceding year.
			Reconstructions use data through 2nd quarter of the current year, with the base year changing.

Chart 4  
Comparison of Various Part A Aged Enrollment And Per Capita Values

Time Period	Action or Report Source	Aged Per Capita Values (1)					Aged Average Enrollment Values (1)				
		1984	1985	1986	1987	1988	1984	1985	1986	1987	1988
7/18/84	DEFRA passed										
	1985 USPPC/AAPCC		\$1,556.82								
11/84-12/84	Reconstruction										
12/12/85	Hospital Freezes + Gramm-Rudman										
1/14/85	FY 1986 Budget	\$1,435.19	\$1,535.00	\$1,567.58	\$1,677.59	\$1,825.00	26.880	27.458	28.079	28.703	29.285
									28.079 (3)		
9/23/85	1986 USPPC/AAPCC			\$1,576.73 (2)							
11/85-12/85	Reconstruction										
3/31/86	1986 Trustees Report	\$1,459.18	\$1,497.50	\$1,557.30	\$1,673.03	\$1,827.41	26.700	27.369	27.985	28.602	29.174
4/ 7/86	COBRA										
										28.602 (6)	
9/ 6/86	1987 USPPC/AAPCC	\$1,461.51 (4)			\$1,595.10 (5)						
10/21/86	OBRA										
11/86-12/86	Reconstruction										
3/30/87	1987 Trustees Report	\$1,471.87	\$1,527.60	\$1,549.65	\$1,590.34	\$1,687.60	26.700	27.369	27.985	28.602	29.174
See Footnotes on following page.											

Chart 4 ( Continued )

Law Changes		Notes	
Law	Major Items Affected	Number	Comment
DEFRA	Medicare Secondary 65-69 workers and spouses PPS increase for FY85, FY86 set at MB+.25 DME provided by HHA at 80%	(1)	All information, unless noted, taken from the Trustees Reports of 1985, 1986, and 1987, Appendix A Table A7, and Appendix B Table 3. Populations are shown in millions.
	Net Impact: Savings?	(2)	From the 1986 USPPC, adjusted to reflect removal of the administrative loading and the addition of Aged ESRD. $1987 \text{ is } ((\$131.32/1.005)^{12} * (28.079 - 0.035) + \$300) / 28.079$
Misc	Hospital payment freeze extended 1% reduction in payments	(3)	Assumed to be the same as the 1985 Trustees Report.
	Net Impact: Savings?	(4)	From the 1987 USPPC background worksheets, adjusted to reflect removal of the administrative loading and the addition of Aged ESRD. $1984 \text{ is } ((\$121.74/1.005)^{12} * (26.700 - 0.027) + \$250) / 26.700$
COBRA	PPS payment increased Indirect Medical Education factor reduced Return on Equity phased out Hospice sunset provision repealed Medicare coverage of new State/Local hires Graduate Medical Education based upon hospital specific amounts Medicare Secondary to 65+ workers and spouses	(5)	From an DACT presentation at a GHAA Conference.
	Net Impact: Savings?	(6)	From an DACT presentation at a GHAA Conference.
OBRA	IHD set at \$520 for 1987 IHD formula linked to PPS and Real case mix PPS payment rate of 1.15% for FY87 and MB-2 for FY88 Capital related payments reduced by 3.5% in FY87, 7% in FY88, and 10% in FY89 PIP eliminated for most services Medicare Secondary for disabled		Reconstructions use data through 2nd quarter of the current year, with the base year changing.
	Net Impact: Cost?		

In order to determine how accurate the three most recent USPCCs appear to have been, we can compare the USPCC values in the charts to the corresponding estimates from the 1987 Trustees Reports (Chart 5).

Chart 5  
Comparison of USPCC's to 1987 Trustees Report

	<u>USPCC *</u>	<u>1987 Trustees Reports</u>	<u>Percent Over - or (Under-) Statement of USPCC</u>
<b>Part A</b>			
		\$1,527	2.0%
1985	\$1,557	1,550	1.7%
1986	1,577	1,590	0.3%
1987	1,595		
<b>Part B</b>			
		736	(1.6%)
1985	\$724	858	(9.1%)
1986	780	985	(12.1%)
1987	866		
<b>Total</b>			
		\$2,263	0.8%
1985	\$2,281	2,408	(2.1%)
1986	2,357	2,575	(4.4%)
1987	2,461		

\* All aged including ESRD enrollees as shown in Charts 3 and 4.

The errors in estimation for Part A are relatively small in our judgment for each of the 3 years. The errors in estimation for Part B are also relatively small in 1985, but clearly they are of substantial magnitude in 1986 and 1987. The 1987 error in Part B, based on current estimates, equals almost a 5% error in total (Part A and Part B) program costs, making a 95% AAPCC more like a 90% AAPCC.

In fairness to those faced with calculating the USPCCs it should be reiterated that the USPCC is calculated at a time which makes it most prone to error - prior to historical reconstruction and after estimates of budget savings have been incorporated in the official HCFA estimates.

Even though the 1986 and 1987 estimates from the 1987 Trustees Reports may change in 1988 and 1989 as the actual claims payments emerge, the magnitude of the deviations are cause for concern. The HMO industry relies on the federal government to provide fair payment for services to be performed. The magnitude of the shortfalls cited above, and the inclusion of Executive Office of Management and Budget (EOMB) in the review cycle will create concern in the industry regarding the government's commitment to deal in good faith.

If HMOs become an increasingly greater proportion of total Medicare expenditures in the near future, there is a concern by HMOs that the budget will be cut by merely holding down the USPCC estimate. Optimistic cost projections used in estimating the USPCC will actually reduce budget outlays by paying HMOs unfairly low payment rates.

#### Solutions to the USPCC Problem

One approach to solving the problem involves reducing much of the potential error introduced into the USPCC by a number of steps.

- a. Reconstruct the historical Medicare claims just prior to the USPCC calculation.
- b. Do not incorporate the effects of recent legislation in the USPCC calculation unless it is very clear that the cost estimate, and the timing of the effective date are realistic.
- c. The USPCC calculation and all assumptions should be fully disclosed and retrospective changes should be reconciled each year. This process should allow sufficient time for industry review and comment.

If the approach outlined above and/or later estimates of the 1986 and 1987 Part B USPCC's do not appear to coverage to the original estimates, then it may become necessary to adjust for past mis-estimates in future USPCC estimates. Under this approach, a future year's AAPCC payment to an HMO would reflect the new year's estimated payment plus or minus an adjustment for the effect of prior errors in estimating the USPCC for that HMO. Such adjustments would need to be controlled to avoid substantial disruptions to annual trends reimbursement for the HMO. Furthermore, if consistent downward bias is apparent, an additional prospective adjustment may also become warranted. Mechanisms could be designed to insure equity and cope with contingencies such as terminating risk contracts.

#### Catastrophic Medicare Proposals

A number of proposals are now before Congress that are designed to limit an enrollee's out-of-pocket costs for medical expenses under the Medicare program. Many of these proposals include some form of coverage for prescription drugs. Some of these proposals also include income related Part B premiums to finance the benefit increases.

At a minimum, the HMO risk contracting process should be considered as part of the legislative process - including timing and cost issues. HMOs must cover the Medicare prescribed benefits, so that retroactive changes or changes with a short implementation period could be potentially disruptive. Many of these "catastrophic" benefits may already be covered by the HMOs and the costs included in the Supplemental Premium. Furthermore, sufficient time should be allowed for the HCFA cost estimates to be reviewed by the industry before being incorporated into the AAPCC, since there are substantial differences in the cost estimates now before Congress. It may also be appropriate to develop different demographic factors for the new benefits.



An additional impact of these "catastrophic coverages" will probably be to reduce the accuracy of the current AAPCC and proposed enhancements. This is because the larger claims will be increased, increasing the overall variance, and reducing the  $R^2$  of the various AAPCC formulae.

3. Pure Geographic Adjustment (PGA)

Geographic Adjustment

The geographic adjustment is used to reflect area differences from the national average medical cost. These can result from either the demographic characteristics of the population (age, sex, welfare or institutional status) or area cost differentials (medical prices, use of services, medical practice patterns, or access to providers). The objective of this parameter in the AAPCC process is to reflect the cost of providing Medicare benefits to individuals in the area, not in an HMO setting. An actuarial objective in the process is to use measures which reflect this and which, at the same time, minimize year-to-year fluctuations. This is especially important in conjunction with HMO risk contracts, since the HMO's must work with formal budgets that increase with secular and other costs over time. Wide swings would be highly disruptive to an HMO's financial operations.

Because of the size of the enrolled populations, varying mortality rates, migration, varying disability rates, claim processing patterns, etc., a significant amount of random fluctuation can be observed in the geographic indices year-to-year, especially in relatively low population counties. Thus, a five year simple averaging technique has been developed for the AAPCC. The objective is not to predict what the index will be for the next year (which is subject to considerable random fluctuation), but rather to predict the long-term average underlying value for the area. This means that the progress of moving 5-year averages should be as stable as possible.

Some HMOs have recently noticed considerable fluctuations in their county AAPCC values. Many of these fluctuations have resulted from the DRG adjustments which are discussed below. However, small counties are subject to considerable random fluctuations and some data problems have been discovered in several counties in Missouri due to processing lags during 1983 and 1984. Yearly changes such as these which appear anomalous should be investigated and corrected, if appropriate.

These fluctuations have led to a number of proposals to increase the geographic average from 5 years to 6 or 7 years. Other proposals for dropping the high and low years, with or without extending the number of years have also been proposed. We have tested these alternatives in Appendix A. The inclusion of more years in the averaging process does not appear to materially improve stability. Dropping the high and low years in the averaging process increases stability in some cases but increases volatility in others. The longer the averaging period or the dropping of the high and low years may also postpone the recognition of a permanent shift in the level of the geographic factor.

One technique which may recognize a level shift in the data on a more timely basis is Box-Jenkins analysis. A level shift in the data can be detected after as little as two years and incorporated into a more reliable prediction equation. Although Box-Jenkins equations can be developed using as few as 5-7 data points, a data base of at least 20 points is recommended. Thus, the reliability of predictions based on 5-7 data points is questionable and additional research could be conducted to determine whether this technique stabilizes the geographic adjustments.

The current geographic averaging technique (and the proposals discussed above) have several limitations:

- a. Each year's ratio in the average is equally weighted. This assumes the fluctuations are all random and that no cyclical patterns or step changes occur.

- b. Changes in the county population over the averaging period are ignored. This assumes the population is homogeneous over time.
- c. All counties are treated in the same manner. This implicitly assumes that the fluctuations are independent of size.

These limitations could be removed by testing a least squares system of equations to develop varying coefficients for each year's ratio. This approach would introduce the following changes:

- a. a seven year history would be used to develop the estimated geographic index.
- b. all counties would be grouped by size (based upon the most recent year population)
- c. a least squares numerical approach (linear programming) would be used to develop coefficients for the seven year history which minimizes the error in estimation of the target geographic index. (This would represent an overdetermined system<sup>17</sup>).

Our approach would also use three different targets in establishing the equations and testing for the balance between accuracy and stability. These targets would be the five year, three year and one year average geographic ratio centered at the target AAPCC year and weighted by the population. The five year target would place more emphasis on stability and the one year target would place more emphasis on yearly accuracy. The choice of which target to ultimately use would be based upon the statistical analysis of the results.

Several advantages could accrue from this approach:

- a. cyclical or step changes could be recognized more quickly
- b. the tradeoff between accuracy and stability can be explicitly examined and determined
- c. the results can be more vigorously examined from a statistical standpoint

- d. the use of the number of years in the historical basis will be a byproduct of the analysis (e.g., if small coefficients are produced for the earlier years, these could be dropped and the coefficients reestimated using fewer years)
- e. the effect of size will automatically be reflected in the coefficients, assuming a smaller coefficient would be developed for the earlier years in the larger county groupings.

Since sufficient history is readily available, this technique could be readily explored for stability of coefficients over several years.

#### 3% Limit on Changes in the PGA

It has been suggested that stability in the AAPCC would be enhanced if a 3% limit per year were placed on the geographic adjustments. Based on the analysis in Appendix A, and assuming that the limit would not apply to the DRG adjustment, this suggestion would appear to have little merit, especially in light of administrative difficulties and perceived inequities which could result from such a system.

#### Allocation of Costs to Residence of Enrollees

HCFA statistical records assign claims to the geographic area in which the Medicare enrollee resides, or at least to where the enrollee's Social Security check is sent (which may not be the actual residence). In order to verify the extent to which this is true, an audit should be performed to test assignment of claims to residence of the beneficiary. Specifically, what happens when someone winters in another state, or what happens when they are institutionalized in another location? The former could be studied through an analysis of enrollee experience and changes of address for Florida and Arizona, for example. Particular focus should include the incurred dating vs. the actual timing of residence.

Even if claims are properly coded to the residence of individuals who divide their time between two different locations, the enrollment in the geographic factor calculation is based upon the reported residence on July 1. A common pattern for "snow birds" is to spend the winter in the Southern areas and to return North for the summer. To the extent that such an individual changes his or her address with the Social Security Administration, then the exposure will be overstated in the North and understated in the South. This will tend to understate the AAPCC in Northern locations, and overstate them in Southern locations. Moreover, if there are no reported changes in address for these enrollees and all the claims are allocated to one location, it is questionable whether the results are appropriate for purposes of establishing HMO payment rates through the AAPCC. The reason is that these enrollees are probably less likely to enroll in HMOs due to the limitation of out-of-area coverage to emergency services only, and they may also have different utilization patterns. This problem should be more fully investigated and corrected. A simple test for this problem could consist of reviewing the January 1 and July 1 enrollments from Florida and Arizona locations to determine if a pattern of summer winter shifting is occurring.

#### Interaction of Geographic Factor with Other AAPCC Changes

Several of the other recommendations in this report will have an impact on the resulting variability of the geographic factor. These recommendations include: a) the use of a contingent distribution (on demographics and prior use) in determining the geographic factors as the residual, b) the implementation of the Diagnostic Cost Grouping approach and c) clarification of the VA impact. Thus, it would be difficult to recommend any specific change in the Geographic Factors until the impact of these other changes have been analyzed.

4. DRG Adjustment to PGA

The DRG adjustment shown in the formula in Section IV.C.1. is conceptual in nature in that it is not explicitly applied in the manner shown. However, it is useful to consider the adjustment as shown to facilitate conceptual discussions regarding the factor and to compare the 1987 AAPCC (after introduction of the factor) to its predecessors, which did not incorporate the adjustment.

In its pure mathematical form, a DRG adjustment is calculated for each of the 5 years in the geographic average. The factor for each year is then multiplied by the geographic index for each year before the 5-year average is calculated. It is the aggregate impact of this process on the geographic adjustment which we have called the DRG factor.

This factor had a very disruptive impact on the AAPCCs calculated in 1987 and is likely to have another disruptive impact, although of somewhat lesser magnitude, in 1988. Two major concerns emerge with regard to the DRG factor. The first concern is with the instability it has created in the risk contract marketplace. Many HMOs were forced to raise their member's premiums substantially, some by over \$20.00 per month in 1987, because of the DRG adjustment. It is questionable what the effects of another adjustment in 1988 will have, but clearly some HMOs are positioning themselves to withdraw from risk contracting, if necessary.

The second concern with the DRG factor is the source data which were used to develop the adjustment. For the 1987 adjustments, HCFA used 100% tabulations of 1985 Part A claims because this was the only credible data source available to develop the adjustment. It is currently unclear whether HCFA intends to calculate the 1988 adjustments with 1985 data, 1986 data, or some combination of these. If the adjustments using 1986 data are substantially different than those using 1985 data, this will introduce more instability. Also, although we are assured by the HCFA actuaries that the details of the calculations regarding pass-through items was handled correctly, to our knowledge this has not yet been verified by independent sources.

One other concern with the DRG adjustment is that it focused solely on inpatient hospital reimbursement rates. However, case mix indices changed substantially, and many cases and costs were shifted to an outpatient basis. These changes were a byproduct of the DRG implementation. They may have also affected the geographic indices but are not considered in the adjustment.

5. Demographic Adjustment

For reference, the demographic factors used by HCFA are included in Appendix B.

Medicaid and Institutional Variance by State

A single set of Medicaid demographic factors for all states is necessarily inaccurate because of the significant variation in coverage classifications among the state Medicaid programs. It would be very difficult to develop a set of Medicaid factors which were state-dependent. However, HCFA should consider alternatives to the current use of one single set of demographic factors for Medicaid enrollees in all states, unless this classification can be eliminated as a result of other enhancements (which seems desirable).

An alternative to the current approach is to create separate demographic cells for medically needy and all other Medicaid eligibles. It may be that Medicaid eligibles who are not medically needy do not differ substantially in cost per capita from non-institutional non-Medicaid members. If this is the case, the "Medicaid, not medically needy" category could be combined with the "non-institutional non-Medicaid" category to simplify the ratebook. A major drawback to this approach would be the lack of available data to test the medically needy cost levels.

Similar concerns over the institutional category result from the varying rates of institutionalization and availability of beds by area. It is unclear whether a bias like the one for using a single set of Medicaid factors for each state also exists for the institutional factors. However, the inconsistency of this variable would suggest its elimination if other approaches can compensate.

#### Medicaid Medically Indigent

It is appropriate to use HMO demographic factors which place all medically indigent persons in the Medicaid category. In an HMO setting, a person who might otherwise be medically indigent will generally not "spend down" to the state required limits in order to become classified as medically indigent, except for nursing home care, in which case they would be in the institutionalized category. Therefore, the HMO will generally not receive the higher AAPCC payment rate for this person even though the enrollee would have been medically indigent under the state's Medicaid program in the fee-for-service environment.

A solution to this is to include some proportion of the medically indigent costs and enrollee counts in the non-institutional non-Medicaid (NINM) category when developing HMO demographic factors. This would increase the NINM age/sex factors and decrease the Medicaid (and possibly the institutional) age/sex factors. It should be noted that this may require the development of separate HMO and non-HMO demographic factors. The set of factors used to calculate the AAPCC (non-HMO demographic factors) would be actuarially equivalent to, but not equal to, the set of factors used to calculate the Average Payment Rate (HMO demographic factors).

#### Normalizing the Geographic Adjustment for Demographics

At one point in the AAPCC calculation, the five-year average geographic adjustment is divided by a one-year average demographic factor to develop a geographic adjustment which is normalized for demographics. The use of a single year's data to create the average demographic factor creates a distortion in the AAPCC development, especially if high HMO enrollment changes the demographic mix of non-HMO enrollees in the county in light of the 5-year averaging. Theoretically, each year's geographic adjustment should be divided by that year's average demographic factor before developing an average. We recommend that HCFA develop the data to effect such a change in the methodology as soon as possible. Furthermore, any AAPCC adjustments for prior use should also be handled in a similar manner.



In addition, the institutional enrollment used to generate the one year average demographic factor is based upon 1980 census data "aged" to the current year. This process can create a distortion, especially in areas where institutionalization patterns, population, or availability of care have changed substantially from 1980.

#### National Average Demographic Factors

The average demographic factor for each major Medicare rating component (Part A Aged, Part B Aged, Part A Disabled, and Part B Disabled) is not 1.00 (see Appendix C). This does not create a distortion in actual payments made to HMOs; however, it does create a distortion in the way people perceive the published AAPCCs. The demographic factors should be normalized each year so that they aggregate as close to 1.00 as possible.

#### Inconsistencies in the Current Demographic Factors

Some apparent inconsistencies in the current demographic factors for disabled enrollees can be seen by examining the factors in Appendix B, Table B-2. In particular, the Institutionalized factors for enrollees aged 60-64 are less than the Non-Institutionalized Non-Medicaid factors in 3 of the 4 categories shown.

Although it is possible that the factors shown illustrate true cost patterns, it is more likely that the relationships are the result of very little exposure in the demographic cells cited. Moreover, HCFA relies on HMOs to tell them when persons are institutionalized. Any HMO which recognizes this inconsistency in the factors is likely to simply not report such a member as institutionalized, thereby receiving greater payment for that member.

## 6. Non-HMO Per Capita Cost Development

### Current Methodology

Appendix D provides an analysis of the non-HMO per capita cost development step of the AAPCC. The analysis indicates that there may be a number of inconsistencies in the calculations.

This step of the AAPCC should remove all Medicare costs associated with HMO members. It is unclear, however, whether HCFA data systems are able to accurately tabulate all such costs.

It is also unclear whether the methods used to spread HMO costs by county are sufficiently accurate to be used in high-penetration counties especially if the geographic allocation for snow-birds is inappropriate as noted earlier. More details are described in Appendix D.

We recommend that HCFA review these procedures and available data resources in depth in order to reduce any problems with this step of the calculation.

### Alternative Approach

An alternative to the current approach of extracting HMO costs late in the development process would be to develop the non-HMO AAPCC directly. Such a process would start with a non-HMO USPCC and apply non-HMO geographic and demographic adjustments.

Presumably, such an approach would provide results similar to that under the current AAPCC. However, it would continue to be as difficult to deal with large HMO penetration issues under such a system as it is with the current approach.

7. Other Parameters

Coordination of Benefits for the Working Aged

HCFA's assumption that national average percentages of working aged persons will enroll in each HMO leads to payment inaccuracies. Currently the USPCC is reduced by working aged savings to reflect the average per member costs of all Medicare Members. This could be remedied by adjusting the USPCC to reflect the average per member costs of only Medicare members who are not working aged. Since working-aged Medicare costs are much less than average, this would increase the USPCC.

The working aged could then be treated as a separate rate cell, like ESRD, or as a separate demographic category, like NINM, Medicaid, or Institutional. This would clearly add accuracy to the AAPCC, and should probably be implemented even if the other demographic factors were eliminated as a result of AAPCC enhancements.

Heart Transplantation Coverage

Coverage of heart transplants (and others covered in the future, e.g., liver) by Medicare presents a special problem in the AAPCC. Inclusion of the expected cost of transplants by area is likely to destabilize the system. An HMO with two heart transplants may incur substantial losses, whereas an identical HMO with no heart transplants may make a small profit. This circumstance would tend to make Medicare much more volatile for risk contracting HMOs.

We recommend that heart transplants be covered outside the scope of the AAPCC, or that HMOs be paid an additional amount for each transplant covered by the HMO. In either case the cost of these transplants should not be included in the USPCC.

### Prior Disability Insurance Adjustments

A number of studies have indicated that individuals who have previously been on Medicare as disabled enrollees have a higher utilization level when they turn 65 than the balance of the enrollees who have not previously been disabled. A number of proposals have been put forth to recognize this with a higher demographic rate adjustment to compensate for the higher utilization levels. We believe this adjustment is appropriate, subject to the proper analysis of the data and cost factors. However, it may become unnecessary if the DCG approach proposed by Ash, et al.<sup>(7)</sup> does a good job of identifying historic chronic users and these are represented in appropriately higher proportions in those previously disabled under Medicare. This might minimize the need for a prior disability adjustment.

### Veterans Administration (VA) Cost Issues

One concern that has developed in the AAPCC determination is a potential cost problem in the areas where VA hospitals are located. The VA coverage is primary to Medicare for coverage in VA facilities. In other words, the VA covers first and Medicare will not generally see the claims of covered enrollees in VA hospitals. It could be expected that the AAPCC in such an area would tend to be understated from the standpoint of the HMO enrollee population who would not likely use a VA hospital. Furthermore, the fewer the community hospitals in the area, the greater the potential impact of the VA hospital and the greater the potential impact on the understatement of the AAPCC. This impact could appear not only in a county in which the VA hospital is located, but probably in surrounding counties as well. Therefore, we would suggest a study be developed identifying VA hospitals across the country, and looking for the effect of relationships (in terms of VA beds vs other community hospital beds) on the AAPCC levels in those areas.

If the results of this study indicate a significant bias in the reimbursement rates in areas with VA hospitals, then this should be a consideration in the development of the overall geographic factors, since the likelihood of individuals in the HMOs using VA hospitals is minimal. However, this could in fact increase the cost to the Medicare program if there is a cost-shift from the VA hospitals to the HMOs. On the other hand there are probably partially offsetting costs to the VA system.

Institutionalization could be another problem associated with the VA issue. If the institutional counts in an area are heavily influenced by the VA, then this could substantially lower the overall AAPCC rates inappropriately. For example, in the demographic adjustment for the county, the VA institutionalized are assumed to have very high utilization levels, even though they are likely to have minimal Medicare costs. This would inappropriately reduce the AAPCC for all other enrollees.

D. HCFA Documentation of the AAPCC Calculation

Much of the confusion in the industry about the AAPCC centers around the issue of documentation. Industry representatives have widely complained that it was not possible to follow an AAPCC calculation from the USPPC to the AAPCC because published information is not sufficient to permit this.

We have included in Appendix E a sample computer development of the AAPCC for Delaware County, PA to serve two purposes. First, this output documents all calculations required to develop the AAPCC for the county. Presumably, a scaled-down version of this example could be developed which would serve the purpose of documenting the AAPCC calculation for each county in the nation. Second, the appendix serves as an example of the AAPCC calculation. A more complete technical description of the calculation is included in the M&R Report to HCFA of November 3, 1983, Cookson.<sup>(1)</sup>

## V. AAPCC Enhancements - Redefining the AAPCC

### A. Accuracy Issues

The objective of the AAPCC, as established by Congress, is to determine a base cost that is representative of the equivalent costs in a fee-for-service environment which is then reduced by 5% to assure cost savings for the Medicare program. The major problems with satisfying this objective are the extreme variability of costs of the participants in any given year, which for any individual can range from \$0 to well in excess of \$100,000, and the lack of cost homogeneity in classifying the eligible population.

The original AAPCC rating variables (age, sex, welfare, institutional status) divided the eligible population into groups with different expected (mean) costs, and developed rating factors that reflected the expected cost differences for each class. This was a classical health insurance practice at the time. It is still widely used in the health insurance industry today (especially for small groups), and is generally termed manual rating. However, within each cell there is still considerable variability and lack of homogeneity of costs.

For larger groups, the insurance industry has used the technique of experience rating which incorporates (wholly or in part) a group's past experience in establishing its future rates. This technique was developed because it was found that past results for a larger group tend to be correlated with its future results.

An experience rating approach for the Medicare-at-risk program was not considered viable for several reasons:

1. It takes away the incentive of the HMOs to reduce costs, since it is similar to cost reimbursement,
2. New enrollees have no Medicare claims history,
3. It would inhibit HMOs from earning incentives for reducing costs (relative to what their enrollees might have otherwise cost) and rewarding their providers for good performance, and
4. The administrative complexity would be potentially unmanageable.

AAPCC  $R^2$  is approximately 1% or less. The  $R^2$  for an individual does give an indication of the potential for bias, since whatever portion of variance is not explainable by the rating formula is subject to exploitation (either intentional or unintentional) if bias results from the enrollment process. However, a substantial portion of the variation in individual claim amounts results from random or unpredictable occurrences. In fact, several estimates have been made that the practical maximum individual  $R^2$  potentially explainable with current state-of-the-art technology is approximately 20% (Welch<sup>(4)</sup>, Newhouse<sup>(10)</sup>, et al.).

This concept can probably be better understood from examining the distribution of individual claim amounts and the amount of the variance contributed by the largest claim amounts. Based upon a distribution of covered charges for Aged Medicare Parts A and B combined using 1977 data (Gresch and Leong<sup>(11)</sup>) we have determined the percentage of total variance which was contributed by the 1%, 2%, and 5% largest claim amounts (Chart 6).

Chart 6  
Percentage of Total Variance Due to Highest  
Catastrophic Claims  
1977 Aged Medicare Parts A and B Covered Charges<sup>(a)</sup>

<u>% Top Catastrophic Claimants of All Eligibles</u>	<u>Percentage of Total Variance Contributed by Catastrophic Claims</u> <sup>(b)</sup>	<u>Estimated Minimum Catastrophic Claim Amount of 1987 Dollars</u> <sup>(c)</sup>	<u>Average Amount of Catastrophic Claims</u> <sup>(c)</sup> 1987
1%	49%	\$35,000	\$57,000
2%	67%	\$25,000	\$42,000
5%	82%	\$14,000	\$29,000

(a) Derived from Table 19C of Gresch and Leong<sup>(11)</sup>.

(b) Defined as sum of squares of catastrophic claim amounts minus total mean claim amount divided by total sums of squares of all claim amounts minus total mean claim amounts.

(c) Amounts are approximate based upon 10% assumed annual increases from 1977.



The statistics in Chart 6 are based on covered charges, rather than payments. Because the variance for catastrophic claims is so large, we do not believe that the use of payments would significantly alter these results. Furthermore, the effect of front-end deductibles would tend to increase the variance contributed by the large claims. This would at least partly offset reductions from copayments and benefit limits, which reduce the variance contributed by the large claims.

In order to substantially reduce the variance contributed by these catastrophic claims, a good estimate of the cost of these claims would need to be produced by the rating formula (AAPCC as revised). The average covered charges per person (1987 dollars at 10% per year) represented by the total population is \$2,500 per year, with costs for the top 1% averaging in excess of \$35,000, and representing 49% of the variance. To significantly reduce this variance, the payment rates for these individuals would have to approach the actual level of claims payments. In fact, complete elimination of this 49% of the variance would require an exact prediction of all the actual claim amounts. For example, if the AAPCC predicted the mean cost of \$57,000 for the top 1% catastrophic claims, then the top 1% would have only contributed 5% of the original total variance and the overall variance would be substantially reduced. However, it does not seem practical or prudent, even if it was possible, to have a rating formula that would produce annual AAPCC capitation rates for some individuals in excess of \$50,000.

Even though this process seems as if it will never produce satisfactory results when viewed on an individual basis, HMOs enroll groups of individuals, and some of the individual variations, to the extent they are random, will tend to offset each other. If this is true, it will produce greater predictability of the rating formula for increasingly large groups, assuming the absence of bias. This is equivalent to saying that a greater portion of the variance of the claims of a group can be explained or reduced by the rating formula. This is demonstrated in many of the proposed health status alternatives (adjustments) such as Ash, et al.<sup>(7)</sup> and described as the group  $R^2$ . In general, the group  $R^2$  shows considerable improvement when used to regress on the retrospective data, but still produces relatively low group  $R^2$  when compared to prospective data.

Ash also explores an additional group accuracy measure labeled the Predictive Ratio. This measure was based on the ratio of (a) the estimated costs from the AAPCC and proposed alternative models to (b) the actual costs of various subgroups (intentionally biased using specific selection criteria). The closer the Predictive Ratio to 1.0, the better the accuracy of the pricing model.

The accuracy issue with the AAPCC is analogous to the accuracy issue with respect to individual DRGs which really revolve around the issue of homogeneity. The DRG system is intended to classify hospital admissions into homogeneous classes of diagnosis groups. One criterion used to measure this homogeneity is the coefficient of variation (CV) (standard deviation divided by the mean), which can be measured in terms of costs, charges, or length of stay. The smaller the CV the tighter the distribution around its mean, the more accurate the DRG is at representing all of the admissions in the cell, and the more homogeneous the class.

The CV is one measure that has not generally been used in conjunction with the AAPCC and alternate proposal evaluations. It should be explored in the search for homogeneity among the risk cells. However, an additional homogeneity criterion should also be explored. For example, many of the prior use proposals are not homogeneous in their risk classification cells, because the claimant's class in the predicted year is often different from the class established by the historical base year. This is due to the volatility of the hospitalization. If the prior use variable is based on a previous year's hospital admissions, there is a high probability that an individual will not be in the same class in the succeeding year. Furthermore, the catastrophic claims will continue to present a major problem with respect to homogeneity and variability as demonstrated earlier. We will have some specific suggestions to deal with some of these issues in the section on Health Status/Prior Use adjustments.

Most of the AAPCC and proposed alternative evaluations that have been performed ignore several factors. In general, the institutional status is generally not available, Part A and B costs are combined, and the geographic variability is ignored. Since most proposals would replace the institutional status (which probably correlates with chronic patients and with higher mortality, both representing high cost claimants), this may not be too important. However, the Part A and Part B costs may have different relationships to the proposed prior use variables and could result in higher  $R^2$  for the total claims (Parts A and B combined) by separately establishing the rating formulae. If the relationships are similar, little improvement in the  $R^2$  should result by separating Part A and Part B costs.

Since the location is known to contribute to the variability of claim amounts, the analysis should be standardized for geography. However, this may require a circular process when first establishing the factors, since the demographic, prior use, and geographic factors are probably not independent. For example, the demographic factors and the utilization rates may vary by area according to differences in prevalence rates (e.g., this has been shown for various types of cancers and for age-sex adjusted mortality rates), and the demographic relationships and costs by diagnosis may vary by area due to provider practice patterns (Wennberg<sup>(12)</sup>). The geographic variability could be an important contributor to the total variance and should be considered before choosing the final prior use factors.

In order to accomplish the measurement reflecting the geographic variation, the final demographic and prior use factors and form of the geographic factors must be determined. Because of the potential dependence of these variables, a conditional distribution must be used which is equivalent to establishing a priority order. We would assume, for example, that the demographic and prior use factors are primary, and any residual by area will fall into the geographic factors. Thus, differences in demographics, prevalence rates, and practice patterns would be reflected in the geographic factors after the demographic and prior use variables are applied.

## B. Geographic Issues

### Problems

The current AAPCC values vary by county for each county in the United States. This has created a number of issues or problems that have been identified and should be addressed to the extent possible. The major issues are:

1. Discontinuities of payment rates within contiguous areas.
2. The large number of different rating areas (there are over 3,000 counties in the United States).
3. The counties do not appear to be homogeneous with respect to cost levels, since parts of some counties are urban while other parts are rural (this produces substantially different cost levels).

4. The integrity of addresses and (a) the location of the institutionalized, (b) whether addresses are changed when people move and (c) potential implications of "snow bird" migration.

No one disputes that there are significant cost differences by geographic area. This is easily demonstrated by looking at the history of costs by counties. In addition, looking at standard commercial health insurer's rating practices have traditionally recognized these factors. Furthermore, age-sex adjusted mortality rates and cancer incidence rates also vary widely by geographic area. The problem is to identify the factors that affect the costs by area so that a homogeneous classification process can be developed.

Geographic costs are affected by two main factors: (1) personal characteristics and (2) provider characteristics. These factors can be divided into numerous subcategories. For example, the personal characteristics can be divided into morbidity (including case mix), demographic and socioeconomic characteristics (including education, income, travel, etc.). The provider characteristics can be divided into availability (density), location, type (teaching/specialty), charge levels, practice patterns, etc.

There are dependencies between the personal and provider characteristics as well as between the various personal characteristics and the various provider characteristics. For example, the income levels and charge levels are interrelated and provider density, practice patterns and charge levels are interrelated. If we simply view the geographic cost relationships as being based on the two major categories, then the factors in the AAPCC and proposed enhancements (prior use) are primarily arrived at by standardizing for the personal characteristics (demographics and morbidity). If we then assume that we are accounting for the personal characteristics to the extent possible, then the objective of the geographic factors is to identify the provider characteristics, which becomes the residual cost factor after all other factors are considered. Thus, we are trying to reflect the availability and density of providers, the charge/cost levels, and the effect of practice patterns on the per enrollee cost within geographic areas.

## Alternative Geographic Classifications

It is reasonable to assume that these provider characteristics are heavily related or correlated to the commerce and transportation patterns within a geographic area. This implies that the use of the Zip Code Sectional Area System may prove fruitful in identifying the proper geographic classifications. This system is established largely along the primary commercial business transportation routes within geographic areas. It would seem logical to expect that the utilization patterns and patterns of individual's use of providers would be consistent.

The number of counties in the current AAPCC is in excess of 3,000. The number of 3-digit zip codes is 1228, and there are approximately 564 Sectional Centers defined as combinations of zip code areas. Each of these sectional areas is classified in terms of its degree of accuracy as a trading area. There are approximately 110 such areas that are considered weak or unsatisfactory as definitions of trading areas.

It may be possible, however, to reclassify some of these areas, if necessary, going to the level of 5 digit zip codes in order to further allocate areas as appropriate.

It should be possible to overlay the urban core/suburban ring proposal advanced by Welch<sup>(13)</sup> on the Zip Code Sectional Area System. This approach recognizes wage level differences and land rent differences, with the core city being the highest and with costs decreasing to reflect the distance from the center through the suburban ring into the rural areas. The one limitation of this approach as it was proposed is that it groups all geographic areas together by size. For example, all areas with over 3 million inhabitants would be classified at the same cost level. We do not believe that this aspect is necessary and in fact may obscure some of the cost differences.

We recommend that the current research being done using 3-digit zip codes investigate the applicability of the Zip Code Sectional Area System with appropriate adjustments in the areas where these don't seem to fit properly. The research should also incorporate into the analysis the urban core suburban ring approach, but without the broad categorizations by size.

If the approach described above could be developed, it would not solve the discontinuity questions between contiguous areas since the urban core would generally have higher reimbursement levels than the suburban ring. However, we feel this is appropriate since it reflects the charge levels and practice patterns of the providers in that location. Furthermore, HMO concerns about these discontinuities are probably based more on their observations of physician fee levels and hospital per diems and much less on any observation about utilization differences or practice patterns. Moreover, the higher cost in the urban core will be seen as an incentive for HMOs to enter the market and shift patients to providers with more efficient cost and practice patterns. This is one of the major objectives of the Medicare at-risk program.

As a by-product of any analyses or studies that are done with these proposals, we believe that a comparison of the zip code/urban core suburban ring approach should be compared to the results produced by the current county methodology. Then a determination can be made as to whether or not the results are actually more practical from the standpoint of the HMOs that are participating in the program. In particular, the geographic discontinuities should be reviewed in comparison to the ones that have already been pointed out.

C. Health Status/Prior Use Adjustments

1. General

Most of the proposed health status/prior use adjustments to the AAPCC have been criticized on the grounds of (a) access (e.g., Part B data not readily available), (b) cost (collecting Activity of Daily Living (ADL) or restricted activity information), or (c) the possibility of perverse incentives (prior hospitalizations). The best alternative we have seen thus far is the Diagnostic Cost Groupings (DCG) proposed by Ash, et al.<sup>(7)</sup>, which seems to adequately deal with most of these criticisms. The initial work was done using pre-PPS data, but we understand that 1984 data is currently being studied to see the impact of DRG reimbursement rates, (presumably) better diagnosis coding, and secondary diagnosis information.

2. Diagnostic Cost Grouping Approach

We believe that the DCG approach is the most promising proposal and should be pursued with the purpose of eventual implementation (perhaps first as a demonstration) after evaluation of the following modifications:

(a) Use of a permanent classification rather than an annual one.

The DCG proposal is based on the prior year's hospital diagnoses (presumably discharge) which implies that one year an individual may be classified as high cost and the next year he may not. Even though the proposal is based upon an HMO total group adjustment, in effect the individual usage patterns will directly impact reimbursements. Since the intent of the DCGs is to identify chronic users, we suggest that the criteria might be established on a permanent basis, i.e., once a person enters a high chronic reimbursement category, he can never revert to a lower reimbursement category (although he can enter any higher reimbursement categories that he qualifies for in the future). This process would add some stability and homogeneity to the risk cell classifications. This process will also increase the perverse incentives to admit for any of the DCG diagnoses, since a single admission triggers a permanently higher payment level. However, the trigger diagnoses were chosen to be relatively immune to manipulation and abuse and the

PRO process could be charged with extra vigilance on these diagnosis codes for HMO patients. Alternatively, a random sampling could be used to verify the appropriateness of the diagnosis coding and admission. In short, administrative procedures could be used to detect gaming. If this is still not considered acceptable, then perhaps a multi-year rather than permanent (e.g., 3 years) classification may be acceptable.

- (b) Project the reimbursement rate for the DCG categories to be representative of the average annual expected future lifetime costs of the patient.

Since the DCGs represent chronic, lifetime conditions, the expected payment rates should reflect the average costs over the individual's future life expectancy. Thus, the peak catastrophic years will be averaged with other high use but presumably non-catastrophic years. This will help reduce the variability of the future costs and increase the  $R^2$  explained by the model. It may also help reduce the perverse incentives by lowering the reimbursement rate differential.

For example, if we look at the lifetime costs of an individual as the sum of a random variable, and ignore mortality, trend and disenrollment/reenrollment questions, a substantial reduction in the CV would result. Using a correlation of costs between all years of .2 (Welch<sup>(4)</sup>) (which would be conservative), the  $CV^2$  for the sum of n years worth of claims (ignoring trend) would be developed as follows:

Let  $x_i$  = Claims for an individual in year i

$$\text{then } X_T = x_1 + x_2 + \dots + x_n = \sum_{i=1}^n x_i$$

assume,  $s_i = s_j = \dots = s$  = standard deviation of an individual's claims

$m_i = m_j = \dots = m$  = expected value of an individual's claims



then  $CV = s / m = \text{coefficient of variation of an individual's claims}$

$$E [X_T] = \sum_{i=1}^n E [x_i] = nm$$

$$V [X_T] = \sum_{i=1}^n V [x_i] + \sum_i \sum_{j \neq i} \text{cov} [x_i, x_j]$$

assuming  $r_{ij} = .2$  for all  $i, j$

$$\begin{aligned} \text{cov} [x_i, x_j] &= r_{ij} s_i s_j \\ &= .2 s^2 \end{aligned}$$

$$\begin{aligned} V [X_T] &= ns^2 + .2 ns^2 \\ &= 1.2 ns^2 \end{aligned}$$

$$\text{and } CV_T^2 = \frac{1.2 ns^2}{(nm)^2}$$

$$= \frac{1.2 CV_1^2}{n} \quad \text{where } CV_1 \text{ is the CV of one year's claims.}$$

Thus, if  $n$  is a life expectancy of 5 to 10 years, the  $CV^2$  would be reduced by 76 to 88%. Obviously, this description is an over simplification but does point to the potential for significant reduction to the variability -- mainly because the catastrophic claims are averaged over longer time periods. This is also consistent with the long term, consistently higher than average claims measured for these chronic enrollees (Gruenberg and Tompkins<sup>(9)</sup>).

This may introduce an incentive for HMOs to disenroll individuals expected to have catastrophic claims. It is unlikely the HMO could be very accurate at predicting the occurrence of the catastrophic cases and inducing them to leave voluntarily; however, we believe this can be tested, as described below. Furthermore, monitoring systems can be implemented to detect and correct such abuse.

(c) Consideration of new treatment patterns.

If new approaches to treatment of high cost chronic cases are developed without inpatient admissions (e.g., complete hospital outpatient treatment), the system should be flexible enough to incorporate the corresponding diagnoses through hospital outpatient surgery or other records.

(d) Address the age-ins with an appropriate adjustment.

Age-ins without a prior diagnosis history could be handled in several ways:

- (1) The HMO could be allowed to provide documentation of prior discharge history, and the Individual would be immediately placed in the appropriate DCG class.
- (2) The first year payment for individuals who have recently aged-in and have had a subsequent admission could be adjusted to reflect the assumed prior existence of the trigger diagnosis.
- (3) Nothing could be done, since the individual will soon be expected to have a trigger diagnosis admission, and the additional early costs can be incorporated into the overall higher DCG rates.

- (e) Test the process through clinical judgment.

After the DCG process is more fully developed, a trial could be established where physicians would have access to the detailed medical records of various patients, and allow them to try to select biased subclasses from the DCGs, as though they were selecting from the HMO's perspective. This should help define the upper limit of the bias that could occur, since (a) the HMOs would probably not have the time or staff to set up such a process and (b) the HMO would have to selectively avoid such enrollments or encourage voluntary disenrollments.

### 3. Mortality Adjustment

Because of the high overall costs levels of Medicare enrollees in the last few years of life (Lubitz<sup>(14)</sup>), it has been suggested on a number of occasions that a mortality adjustment be incorporated into the AAPCC methodology. We examined this issue in our 1983 report (Cookson<sup>(1)</sup>) and felt that it does have considerable merit from a technical standpoint. However, the concern about the perverse incentives, where a mortality adjustment would be implemented on a retrospective basis, makes this a very undesirable technique.

It might be possible to consider mortality on a prospective basis using an experience rating type approach as might be used in group life insurance pricing. This could include an analysis of past age/sex adjusted mortality experience and the use of credibility factors in attempting to estimate the true underlying mortality experience of the group. Further refinements might even examine mortality by cause of death since, for example, heart disease and cancer would probably be more highly correlated with high medical cost than other types of causes of death.

It might also be possible to incorporate such an analysis in conjunction with the prior use DCG proposals discussed above. We still believe, however, that rewarding an HMO for a higher mortality level by paying them higher AAPCC rates still provides a perverse incentive and probably is not acceptable from a policy/ethical standpoint.

4. Stop Loss

Use of the catastrophic stop loss limits during the early durational years for new HMO enrollees was discussed extensively in the M&R report in 1983 (Cookson<sup>(1)</sup>). We believe that this represents a good approach to minimize the potential impact of selection both for and against the Medicare program. However, a number of concerns are expressed by both the government and the industry with respect to such a program. The government is concerned about the retrospective issues of such a stop loss program. The industry is concerned because it believes it can substantially reduce costs of large claims. They would be losing a substantial part of their incentive margin that is used to subsidize the more intensive ambulatory care provided in the HMO environment.

The reason this approach is effective is because it substantially reduces the overall variance of the individual claim distributions as noted in the section on accuracy of the AAPCC. Furthermore, it provides the opportunity for catastrophic protection for HMOs as their experience grows and develops. It would also be possible to construct such a program in a way that the government had no risk by establishing a pool of funds available to pay for catastrophic losses. That fund would be the portion of the AAPCC withheld based on the estimates on the expected costs on the fee-for-service system. Then, that fund would be prorated over all the catastrophic claims submitted to the Fund. If there was an excess in the Fund, the excess could be prorated over all the HMOs according to their overall AAPCC reimbursement levels.

We believe this is a good approach, but because there is significant disagreement, we do not feel a reasonable consensus can be achieved on implementing such a program. Therefore, we do not recommend it at this time.

D. Regression Toward the Mean

One final issue which has the potential to minimize many of the concerns about the lack of homogeneity in the rating cells and the potential for bias in the enrollment process is the concept identified as regression toward the mean. Several papers have been written on this subject including two by Welch<sup>(4),(5)</sup> that give a good description of the process, analyzing the difference between the chronic and acute aspects of the utilization patterns. A draft paper by Beebe<sup>(3)</sup> analyzes the experience of a cohort of enrollees from 1974 through 1980. Beebe<sup>(3)</sup> also simulates the impact of various groups when selected on a biased random basis. It appears that the key to the regression towards the mean phenomenon rests with the mix of chronic and acute utilizers within any sub-population that is selected.

The concept works as follows. If a population is picked based on its high usage level, then its experience will tend to move toward the mean over time, with rapid movement occurring in the first year and with the progressively slower movement for subsequent years. A similar phenomenon would happen with groups of low utilizers. In general, the overall experience of groups chosen on such a basis would probably not actually reach the mean within any short term time frame. When groups are chosen strictly based on their level of usage, there is a mixture of chronic and acute utilizers that determines the current year usage and will determine the subsequent regression towards the mean. Thus, the chronic utilizers, who will on average be expected to have higher costs over a longer term, will probably continue to persist at a high level throughout the period being studied. The high or low acute utilizers will tend to progress rapidly toward the mean. The mix of chronics and acute utilizers will determine the overall level toward which the cohort will regress. The closer the cohort mix of chronics is to the population mix, the closer to the mean it will regress.

The biased selection issue that has been studied and reported in the literature (Beebe, et al.<sup>(15)</sup>), has studied primarily group practice HMO experience and a few IPAs. In general, the studies have found that there was very favorable biased selection for the group practice HMOs, but less favorable or perhaps even unfavorable biased selection for the IPA structures. The concept generally used to explain this phenomenon was the fact that the self-selection HMO enrollment process for an individual is heavily influenced by his current medical status and his relationship with his primary physician. The theory is that if a person is sick and

has been heavily using his physician, he is less willing to break that relationship in order to join an HMO. This implies that in the case of a group practice HMO, where most people would have to break their existing physician relationships, very favorable bias for the HMO would occur. Conversely, in the case of a broad-based IPA where many of the physicians in the community are members, more enrollees will be able to maintain their existing physician relationship, and there will be less impact or less favorable bias for the HMO. In some cases it might possibly result in unfavorable biased selection against the IPA-HMO because the sicker people will have better benefits while maintaining their existing physician relationships.

A key question on the biased selection issue concerns any difference in the enrollment decisions for those currently with active physician relationships between chronic and acute patients. To the extent that the enrollment would be more discouraged for the chronic users, then the regression toward the mean phenomenon would be less likely to occur. However, if the acute and chronic patients were equally affected by the relationship, then one would expect some element of regression toward the mean.

The issue becomes less significant if chronic users are identifiable through the DCG (Diagnostic Cost Group) approach proposed by Ash, et al.<sup>(7)</sup> and as modified per our recommendations in the previous section. If the overall variance can be reduced by looking at permanent chronic users and their long term cost implications, the predictability of the models should be greatly enhanced and the concern about the regression toward the mean phenomenon reduced. In any event, if there is selection based on cost (not chronic use) over the short run, the costs will begin to regress towards the mean. Furthermore, the impact of any windfall gains or losses will be short lived, at least to the extent that they are large.

E. Other Issues

1. High HMO Penetration

When the HMO percentage of the population in given counties reaches a high enough penetration level and/or the HMO penetration causes the non-HMO population to become very small, then the use of the non-HMO enrollee costs may not be appropriate to set the HMO reimbursement rate. Several key factors can be utilized at that time.

The first alternative is the rate of change in the USPCC. This is indicative of the overall fee-for-service trends.

The second alternative is to aggregate together the experience of all non-HMO enrollees in all of the counties with high HMO penetration. This could be used as a base line to measure trends that could then be applied to the AAPCCs in the high HMO penetration areas. More than likely it will not be advisable to rely totally on this grouping because of the odd characteristics of the non-HMO enrollees that might be present and some blending with the USPCC trends might be applicable. Care must be exercised in standardizing for any mix changes.

The third alternative is to look at the changes in the AAPCC for other counties in the immediate geographic area, in the balance of the state, or in the region. These aggregations would not be used to determine the AAPCC, but rather to determine the trends in the AAPCCs to be applicable to the high HMO penetration areas.

Probably the best approach, at least for the time being, to deal with the high HMO penetration areas is a blend of those suggested above. The USPCC is indicative of overall trend levels, the non-HMO enrollee aggregate AAPCC trends are indicative of the overall trends in those high penetration areas, and the immediate geographic area trends are also indicative of what might be happening at the local level. Preferably some blend of these would produce reasonable and acceptable results. We would recommend that studies be conducted in areas where high HMO penetration currently exists to see if these approaches appear reasonable and to develop the type of blending which would be most appropriate.

## 2. Disenrollment Issues

Several studies have been developed identifying the experience of HMO disenrollees to determine whether or not the disenrollees have higher than average, average, or lower than average costs. This is similar to the concern expressed over the prior use and the favorable selection or potential anti-selection by HMOs. The process and the concept are completely analogous. However, the factors affecting disenrollment may be somewhat different. Studies by Wrightson and Genuardi<sup>(16)</sup> have shown some indication that HMO disenrollees tend to be lower in cost than those enrollees who remain in the HMO. This is consistent with the hypothesis discussed in the regression to the mean section concerning the reluctance of enrollees to switch providers or to change their insurance program in the course of active medical treatment. However, indications are that the evaluations from the Demonstration Projects may show biased selection on disenrollment, at least based on prior use.

To the extent that the approaches recommended to improve the AAPCC, outlined in the section on prior use/health status, are successful at reducing the bias in the selection process, then there is no reason to believe that they would not be effective as well with respect to the disenrollment process. Thus, if the recommendations lead to a revised AAPCC that reduces bias and reduces the variance, then this issue is minimized from the standpoint of risk.

On the other hand, HCFA should be concerned about high disenrollment rates or patterns of disenrollment that might suggest dissatisfaction on the part of the enrollees. Obviously the effect of competition will be to encourage disenrollment because that would be the process by which competitors would be able to gain enrollment. However, large scale disenrollment results could indicate dissatisfaction with the program, and any HMOs with significant disenrollment rates should be reviewed from the standpoint of whether they are providing satisfactory programs for Medicare enrollees.



3. Unmet Needs, Frontier Areas

In areas that are underserved by medical care providers and facilities the AAPCC is likely to be low relative to what it would otherwise be in most geographic areas with more normal provider levels. The availability of an HMO option in such an area is likely to substantially increase the utilization levels above those in the fee-for-service sector. Thus, the AAPCC will substantially underpay the HMO if the demand for service would increase. The alternatives left to the HMO in such a situation would be a) to provide less than the normal quality level of services expected of HMOs, or b) to avoid the market in order to prevent substantial financial losses.

Appendix A  
Analysis of Geographic Indices

This appendix illustrates the calculation of geographic adjustments for 22 counties with over 500 average HMO\* members in calendar year 1984. The counties were grouped into 6 sets based on 1984 aged aggregate Medicare enrollment in the county, as follows:

Group 1	9,000 to 12,000 enrollees
Group 2	20,000 to 30,000 enrollees
Group 3	45,000 to 55,000 enrollees
Group 4	90,000 to 110,000 enrollees
Group 5	200,000 to 250,000 enrollees
Group 6	over 500,000 enrollees.

Geographic adjustments were calculated on the following basis, using Medicare reimbursement and enrollment tables directly as a source. No adjustments were made to reflect data not included in these tables.

- 4 year average
- 5 year average
- 6 year average
- 7 year average
- 3 of the last 5 year average, dropping high and low ratios
- 4 of the last 6 year average, dropping high and low ratios
- 5 of the last 7 year average, dropping high and low ratios

The various methods of calculating geographic adjustments were tested only for stability. Comparisons were made based on the average of the absolute deviations of relative change from year to year. Separate comparisons were made on the same basis but using only the 4 geographic adjustments calculated for 1980 to 1983.

\* Primarily cost reimbursement HMOs, and risk demonstration projects.

## APPENDIX A

## Analysis of Geographic Measures

## Summary of Variance Measures Over all Available Years

Coverage: Part A								
County	State	4 Year Average	5 Year Average	6 Year Average	7 Year Average	Modified* 5 Year Average	Modified* 6 Year Average	Modified* 7 Year Average
Group 1								
Arizon, West Virginia		0.044	0.039	0.038	0.030	0.036	0.035	0.031
Alaska, California		0.051	0.046	0.046	0.044	0.050	0.045	0.044
Idaho, Minnesota		0.028	0.030	0.028	0.028	0.030	0.030	0.030
Delaware, Pennsylvania		0.033	0.034	0.033	0.034	0.028	0.031	0.029
Group 2								
Alaska, Oregon		0.014	0.013	0.012	0.009	0.014	0.013	0.011
Idaho, Illinois		0.024	0.015	0.012	0.011	0.018	0.017	0.016
Idaho, Michigan		0.013	0.007	0.008	0.008	0.008	0.009	0.009
Idaho, Pennsylvania		0.054	0.058	0.055	0.051	0.061	0.065	0.060
Group 3								
Idaho, Washington		0.008	0.008	0.008	0.008	0.008	0.008	0.008
Idaho, Utah		0.022	0.017	0.010	0.008	0.014	0.007	0.003
Idaho, Maryland		0.009	0.006	0.004	0.002	0.008	0.003	0.003
Idaho, Nevada		0.030	0.019	0.020	0.020	0.021	0.026	0.027
Group 4								
Idaho, Michigan		0.015	0.014	0.015	0.016	0.017	0.016	0.016
Idaho, Connecticut		0.033	0.033	0.033	0.033	0.035	0.036	0.036
Idaho, New Jersey		0.026	0.023	0.020	0.015	0.021	0.020	0.016
Idaho, Ohio		0.014	0.007	0.007	0.009	0.006	0.010	0.012
Group 5								
Idaho, Pennsylvania		0.032	0.038	0.031	0.029	0.037	0.043	0.036
Idaho, Michigan		0.025	0.016	0.007	0.005	0.016	0.009	0.005
Idaho, New York		0.031	0.030	0.027	0.026	0.032	0.032	0.032
Idaho, Florida		0.016	0.015	0.010	0.007	0.009	0.007	0.002
Group 6								
Idaho, Illinois		0.026	0.020	0.014	0.011	0.021	0.014	0.009
Idaho, California		0.010	0.009	0.010	0.007	0.010	0.010	0.008
Total	United States	0.000	0.000	0.000	0.000	0.000	0.000	0.000

The High and Low Points are Not Included in the Average

## APPENDIX A

## Analysis of Geographic Measures

## Summary of Variance Measures Over all Available Years

		Coverage: Part B						
County	State	4 Year Average	5 Year Average	6 Year Average	7 Year Average	Modified* 5 Year Average	Modified* 6 Year Average	Modified* 7 Year Average
Group 1								
Marion,	West Virginia	0.024	0.025	0.029	0.025	0.024	0.029	0.022
Lake,	California	0.021	0.018	0.011	0.020	0.015	0.008	0.018
Stearns,	Minnesota	0.015	0.006	0.008	0.008	0.008	0.011	0.011
Somerset,	Pennsylvania	0.030	0.024	0.030	0.035	0.028	0.033	0.036
Group 2								
Clackamas,	Oregon	0.040	0.042	0.041	0.039	0.043	0.044	0.042
Winnebago,	Illinois	0.016	0.012	0.008	0.006	0.011	0.010	0.005
Ingham,	Michigan	0.030	0.030	0.029	0.020	0.025	0.025	0.025
Fayette,	Pennsylvania	0.050	0.042	0.049	0.049	0.048	0.054	0.052
Group 3								
Pierce,	Washington	0.024	0.018	0.020	0.020	0.027	0.026	0.027
Salt Lake,	Utah	0.018	0.018	0.018	0.020	0.017	0.016	0.017
Montgomery,	Maryland	0.010	0.011	0.011	0.006	0.013	0.012	0.007
Clark,	Nevada	0.012	0.005	0.003	0.007	0.008	0.004	0.008
Group 4								
Oakland,	Michigan	0.031	0.030	0.031	0.023	0.028	0.027	0.028
Fairfield,	Connecticut	0.024	0.023	0.024	0.019	0.022	0.021	0.018
Essex,	New Jersey	0.019	0.013	0.016	0.014	0.011	0.014	0.010
Hamilton,	Ohio	0.018	0.022	0.016	0.016	0.024	0.022	0.020
Group 5								
Philadelphia,	Pennsylvania	0.012	0.009	0.009	0.008	0.010	0.010	0.007
Wayne,	Michigan	0.042	0.040	0.041	0.033	0.043	0.042	0.043
Queens,	New York	0.020	0.014	0.011	0.006	0.013	0.010	0.006
Broward,	Florida	0.008	0.007	0.008	0.005	0.006	0.006	0.004
Group 6								
Cook,	Illinois	0.047	0.024	0.023	0.011	0.027	0.028	0.016
Los Angeles,	California	0.010	0.004	0.005	0.005	0.005	0.007	0.007
Total	United States	0.000	0.000	0.000	0.000	0.000	0.000	0.000

\* The High and Low Points are Not Included in the Average

## APPENDIX A

## Analysis of Geographic Measures

## Summary of Variance Measures Over the Three Last Years

		Coverage: Part A						
County	State	4 Year Average	5 Year Average	6 Year Average	7 Year Average	Modified* 5 Year Average	Modified* 6 Year Average	Modified* 7 Year Average
Group 1								
Marion,	West Virginia	0.056	0.053	0.047	0.030	0.046	0.045	0.031
Lake,	California	0.028	0.035	0.046	0.044	0.025	0.037	0.044
Stearns,	Minnesota	0.032	0.031	0.026	0.028	0.035	0.032	0.030
Somerset,	Pennsylvania	0.043	0.040	0.034	0.034	0.038	0.034	0.029
Group 2								
Clackamas,	Oregon	0.018	0.015	0.009	0.009	0.019	0.013	0.011
Winnebago,	Illinois	0.027	0.017	0.014	0.011	0.021	0.021	0.016
Ingham,	Michigan	0.014	0.008	0.009	0.008	0.010	0.012	0.009
Fayette,	Pennsylvania	0.068	0.062	0.057	0.051	0.074	0.069	0.060
Group 3								
Pierce,	Washington	0.006	0.006	0.008	0.008	0.005	0.006	0.008
Salt Lake,	Utah	0.022	0.017	0.009	0.008	0.011	0.006	0.003
Montgomery,	Maryland	0.008	0.006	0.004	0.002	0.008	0.004	0.003
Clark,	Nevada	0.034	0.011	0.018	0.020	0.004	0.025	0.027
Group 4								
Oakland,	Michigan	0.027	0.018	0.015	0.016	0.022	0.017	0.016
Fairfield,	Connecticut	0.030	0.032	0.033	0.033	0.032	0.034	0.036
Essex,	New Jersey	0.024	0.020	0.019	0.015	0.015	0.017	0.016
Hamilton,	Ohio	0.015	0.008	0.006	0.009	0.008	0.009	0.012
Group 5								
Philadelphia,	Pennsylvania	0.026	0.032	0.031	0.029	0.037	0.040	0.036
Wayne,	Michigan	0.024	0.012	0.005	0.005	0.013	0.006	0.005
Queens,	New York	0.022	0.026	0.027	0.026	0.024	0.030	0.032
Broward,	Florida	0.014	0.013	0.008	0.007	0.008	0.008	0.002
Group 6								
Cook,	Illinois	0.017	0.009	0.007	0.011	0.010	0.006	0.009
Los Angeles,	California	0.012	0.009	0.010	0.007	0.010	0.011	0.008
Total	United States	0.000	0.000	0.000	0.000	0.000	0.000	0.000

\* The High and Low Points are Not Included in the Average

## APPENDIX A

## Analysis of Geographic Measures

## Summary of Variance Measures Over the Three Last Years

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		Coverage: Part B						
County	State	4 Year Average	5 Year Average	6 Year Average	7 Year Average	Modified* 5 Year Average	Modified* 6 Year Average	Modified* 7 Year Average
Group 1								
Marion,	West Virginia	0.015	0.022	0.028	0.021	0.019	0.025	0.019
Lake,	California	0.027	0.003	0.006	0.009	0.004	0.009	0.012
Stearns,	Minnesota	0.043	0.002	0.004	0.005	0.002	0.006	0.007
Somerset,	Pennsylvania	0.055	0.023	0.027	0.028	0.024	0.030	0.025
Group 2								
Clackamas,	Oregon	0.024	0.028	0.031	0.032	0.025	0.028	0.032
Winnebago,	Illinois	0.037	0.005	0.009	0.006	0.009	0.009	0.005
Ingham,	Michigan	0.048	0.016	0.021	0.014	0.015	0.021	0.016
Fayette,	Pennsylvania	0.057	0.033	0.041	0.038	0.025	0.038	0.037
Group 3								
Pierce,	Washington	0.023	0.010	0.009	0.011	0.017	0.013	0.016
Salt Lake,	Utah	0.039	0.012	0.013	0.015	0.010	0.008	0.011
Montgomery,	Maryland	0.047	0.008	0.004	0.002	0.014	0.005	0.002
Clark,	Nevada	0.037	0.003	0.003	0.004	0.004	0.004	0.005
Group 4								
Oakland,	Michigan	0.007	0.014	0.022	0.016	0.010	0.018	0.018
Fairfield,	Connecticut	0.028	0.022	0.015	0.008	0.020	0.010	0.008
Essex,	New Jersey	0.033	0.005	0.010	0.010	0.008	0.009	0.004
Hamilton,	Ohio	0.046	0.017	0.014	0.011	0.008	0.018	0.013
Group 5								
Philadelphia,	Pennsylvania	0.011	0.011	0.008	0.007	0.010	0.008	0.007
Wayne,	Michigan	0.024	0.022	0.029	0.022	0.019	0.028	0.027
Queens,	New York	0.031	0.008	0.006	0.004	0.003	0.003	0.005
Broward,	Florida	0.024	0.008	0.008	0.005	0.003	0.005	0.004
Group 6								
Cook,	Illinois	0.026	0.023	0.017	0.006	0.016	0.016	0.008
Los Angeles,	California	0.032	0.003	0.002	0.004	0.005	0.002	0.005
Total	United States	0.000	0.000	0.000	0.000	0.000	0.000	0.000

\* The High and Low Points are Not Included in the Average

## APPENDIX A

## Analysis of Geographic Indices

## Summary of Geographic Indices

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Coverage: Part A											
County	State	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Group 1											
Marion,	West Virginia	0.663	0.593	0.593	0.524	0.615	0.671	0.701	0.729	0.720	0.801
Lake,	California	0.794	0.739	0.809	0.868	1.017	1.053	1.034	1.170	0.983	1.053
Stearns,	Minnesota	1.047	0.994	0.975	0.927	0.979	0.907	0.856	0.838	0.831	0.798
Somerset,	Pennsylvania	0.723	0.782	0.782	0.793	0.790	0.842	0.866	0.906	0.936	1.028
Group 2											
Clackamas,	Oregon	0.856	0.915	0.889	0.865	0.864	0.898	0.971	0.984	0.913	0.924
Winnebago,	Illinois	0.809	0.825	0.873	0.828	0.713	0.897	0.828	0.764	0.782	0.769
Ingham,	Michigan	1.137	1.123	1.071	1.134	1.069	1.116	1.150	1.038	1.033	1.068
Fayette,	Pennsylvania	0.707	0.704	0.771	0.738	0.749	0.862	0.941	1.000	1.012	1.055
Group 3											
Pierce,	Washington	0.712	0.711	0.728	0.737	0.741	0.747	0.754	0.758	0.750	0.768
Salt Lake,	Utah	0.669	0.711	0.699	0.738	0.772	0.764	0.728	0.731	0.707	0.643
Montgomery,	Maryland	1.006	0.967	0.959	0.955	1.012	0.999	1.031	0.993	0.974	0.978
Clark,	Nevada	1.206	1.147	1.350	1.317	1.048	1.346	1.389	1.413	1.332	1.192
Group 4											
Oakland,	Michigan	1.476	1.424	1.350	1.378	1.421	1.428	1.348	1.262	1.269	1.255
Fairfield,	Connecticut	1.317	1.313	1.260	1.195	1.162	1.113	1.081	1.043	1.022	1.011
Essex,	New Jersey	1.364	1.398	1.347	1.306	1.263	1.208	1.184	1.195	1.206	1.385
Hamilton,	Ohio	1.159	1.029	1.077	1.145	1.124	1.151	1.085	1.036	1.116	1.068
Group 5											
Philadelphia,	Pennsylvania	1.262	1.225	1.344	1.331	1.314	1.584	1.531	1.521	1.577	1.595
Wayne,	Michigan	1.414	1.522	1.462	1.569	1.598	1.705	1.566	1.504	1.446	1.475
Jewens,	New York	1.408	1.362	1.397	1.339	1.230	1.107	1.190	1.186	1.135	1.168
Broward,	Florida	1.008	1.218	1.178	1.127	1.090	1.103	1.113	1.123	1.176	1.196
Group 6											
Cook,	Illinois	1.318	1.405	1.497	1.467	1.577	1.628	1.647	1.570	1.502	1.483
Los Angeles,	California	1.476	1.468	1.466	1.505	1.481	1.520	1.559	1.570	1.574	1.453
Total	United States	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

## APPENDIX A

## Analysis of Geographic Indices

## Summary of Geographic Indices

		Coverage: Part B									
County	State	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Group 1											
Marion, West Virginia		0.511	0.487	0.440	0.455	0.522	0.533	0.479	0.550	0.538	0.611
Lake, California		1.116	1.450	1.441	1.334	1.324	1.504	1.305	1.426	1.294	1.342
Stearns, Minnesota		0.733	0.737	0.740	0.717	0.674	0.754	0.760	0.684	0.730	0.669
Somerset, Pennsylvania		0.530	0.518	0.557	0.564	0.639	0.578	0.555	0.620	0.695	0.720
Group 2											
Clackamas, Oregon		0.989	1.048	1.037	0.943	0.899	0.830	0.806	0.842	0.748	0.738
Winnebago, Illinois		0.816	0.818	0.884	0.802	0.787	0.714	0.844	0.824	0.780	0.827
Ingham, Michigan		0.843	0.878	0.751	0.801	0.871	0.902	1.043	0.953	0.978	0.917
Fayette, Pennsylvania		0.522	0.483	0.503	0.508	0.640	0.555	0.608	0.642	0.690	0.758
Group 3											
Pierce, Washington		0.852	0.924	0.878	0.997	0.882	0.874	1.035	1.030	1.025	1.003
Salt Lake, Utah		0.959	0.940	0.922	0.866	0.878	0.872	0.859	0.857	0.803	0.782
Montgomery, Maryland		1.505	1.460	1.407	1.391	1.460	1.488	1.282	1.380	1.461	1.356
Clark, Nevada		1.466	1.522	1.534	1.472	1.415	1.517	1.448	1.543	1.520	1.400
Group 4											
Oakland, Michigan		1.389	1.430	1.244	1.337	1.504	1.524	1.707	1.610	1.642	1.526
Fairfield, Connecticut		1.374	1.180	1.107	1.289	1.175	1.182	1.095	1.101	1.056	1.029
Essex, New Jersey		1.408	1.177	1.449	1.338	1.292	1.337	1.259	1.277	1.267	1.272
Hamilton, Ohio		0.790	0.898	0.760	0.883	0.761	0.900	0.883	0.879	0.929	0.933
Group 5											
Philadelphia, Pennsylvania		1.552	1.482	1.516	1.495	1.480	1.551	1.530	1.561	1.602	1.628
Wayne, Michigan		1.254	1.333	1.165	1.245	1.442	1.472	1.640	1.567	1.635	1.532
Queens, New York		1.281	1.413	1.339	1.450	1.358	1.274	1.260	1.211	1.317	1.328
Broward, Florida		1.642	1.687	1.728	1.746	1.687	1.638	1.671	1.645	1.674	1.562
Group 6											
Cook, Illinois		0.983	1.051	0.983	0.843	1.263	0.967	1.176	1.108	1.056	1.106
Los Angeles, California		1.772	1.726	1.817	1.758	1.786	1.853	1.715	1.814	1.786	1.737
Total	United States	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000



## APPENDIX A

## Analysis of Geographic Indices

## Four Year Average Geographical Indices

## Coverage: Part A

County	State	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	Variance Measure*	3 Year Variance Measure*
Group 1													
Marion,	West Virginia				0.593	0.581	0.601	0.628	0.679	0.705	0.738	0.044	0.056
Lake,	California				0.802	0.858	0.937	0.993	1.069	1.060	1.060	0.051	0.028
Stearns,	Minnesota				0.986	0.969	0.947	0.917	0.895	0.858	0.831	0.028	0.032
Somerset,	Pennsylvania				0.770	0.787	0.802	0.823	0.851	0.888	0.934	0.033	0.043
Group 2													
Clackamas,	Oregon				0.881	0.883	0.879	0.900	0.929	0.942	0.948	0.014	0.018
Winnebago,	Illinois				0.834	0.810	0.828	0.817	0.801	0.818	0.786	0.024	0.027
Ingham,	Michigan				1.116	1.099	1.097	1.117	1.093	1.084	1.072	0.013	0.014
Fayette,	Pennsylvania				0.730	0.741	0.780	0.823	0.888	0.954	1.002	0.054	0.068
Group 3													
Pierce,	Washington				0.722	0.729	0.738	0.745	0.750	0.752	0.757	0.008	0.006
Salt Lake,	Utah				0.704	0.730	0.743	0.750	0.749	0.732	0.702	0.022	0.022
Montgomery,	Maryland				0.972	0.973	0.981	0.999	1.009	0.999	0.994	0.009	0.008
Clark,	Nevada				1.255	1.215	1.265	1.275	1.299	1.370	1.331	0.030	0.034
Group 4													
Oakland,	Michigan				1.407	1.393	1.394	1.394	1.365	1.327	1.283	0.015	0.027
Fairfield,	Connecticut				1.271	1.233	1.183	1.138	1.100	1.065	1.039	0.033	0.030
Essex,	New Jersey				1.354	1.329	1.281	1.240	1.213	1.198	1.242	0.026	0.024
Hamilton,	Ohio				1.102	1.094	1.124	1.126	1.099	1.097	1.076	0.014	0.015
Group 5													
Philadelphia,	Pennsylvania				1.291	1.303	1.393	1.440	1.487	1.553	1.556	0.032	0.026
Wayne,	Michigan				1.492	1.538	1.584	1.610	1.594	1.556	1.498	0.025	0.024
Queens,	New York				1.377	1.332	1.268	1.216	1.178	1.154	1.170	0.031	0.022
Broward,	Florida				1.133	1.153	1.125	1.109	1.107	1.129	1.152	0.016	0.014
Group 6													
Cook,	Illinois				1.422	1.487	1.542	1.580	1.606	1.587	1.550	0.026	0.017
Los Angeles,	California				1.479	1.480	1.493	1.516	1.533	1.556	1.539	0.010	0.012
Total	United States				1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.000

\* Average of (Absolute Value of (Annual % Changes in Geographic Index))

## APPENDIX A

## Analysis of Geographic Indices

## Four Year Average Geographical Indices

## Coverage: Part 8

County	State	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	Variance Measure*	3 Year Variance Measure*
Group 1													
Marion, Lake,	West Virginia				0.473	0.476	0.487	0.497	0.521	0.525	0.545	0.024	0.015
Stearns,	California				1.335	1.387	1.401	1.367	1.390	1.382	1.341	0.021	0.027
Somerset,	Minnesota				0.732	0.717	0.721	0.726	0.718	0.732	0.711	0.015	0.043
	Pennsylvania				0.542	0.569	0.584	0.584	0.598	0.612	0.647	0.030	0.055
Group 2													
Clackamas,	Oregon				1.004	0.982	0.927	0.869	0.844	0.806	0.783	0.040	0.024
Winnebago,	Illinois				0.830	0.823	0.797	0.787	0.792	0.791	0.819	0.016	0.037
Ingham,	Michigan				0.818	0.825	0.831	0.904	0.942	0.969	0.973	0.030	0.048
Fayette,	Pennsylvania				0.504	0.533	0.551	0.578	0.611	0.624	0.674	0.050	0.057
Group 3													
Pierce,	Washington				0.913	0.921	0.908	0.947	0.955	0.991	1.023	0.024	0.023
Salt Lake,	Utah				0.922	0.901	0.885	0.869	0.867	0.848	0.825	0.018	0.039
Montgomery,	Maryland				1.441	1.430	1.437	1.405	1.402	1.403	1.370	0.010	0.047
Clark,	Nevada				1.498	1.486	1.484	1.463	1.481	1.507	1.478	0.012	0.037
Group 4													
Oakland,	Michigan				1.350	1.379	1.402	1.518	1.586	1.621	1.621	0.031	0.007
Fairfield,	Connecticut				1.237	1.188	1.188	1.186	1.139	1.109	1.070	0.024	0.028
Essex,	New Jersey				1.343	1.314	1.354	1.306	1.291	1.285	1.269	0.019	0.033
Hamilton,	Ohio				0.833	0.825	0.826	0.856	0.856	0.898	0.906	0.018	0.046
Group 5													
Philadelphia,	Pennsylvania				1.511	1.493	1.510	1.514	1.531	1.561	1.580	0.012	0.011
Wayne,	Michigan				1.249	1.296	1.331	1.450	1.530	1.579	1.594	0.042	0.024
Queens,	New York				1.371	1.390	1.355	1.335	1.276	1.266	1.279	0.020	0.031
Broward,	Florida				1.701	1.712	1.700	1.686	1.660	1.657	1.638	0.008	0.024
Group 6													
Cook,	Illinois				0.965	1.035	1.014	1.063	1.129	1.077	1.111	0.047	0.026
Los Angeles,	California				1.768	1.772	1.804	1.778	1.792	1.792	1.763	0.010	0.032
Total	United States				1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.000

\* Average of (Absolute Value of (Annual % Changes in Geographic Index))

## APPENDIX A

## Analysis of Geographic Indices

## Five Year Average Geographical Indices

		Coverage: Part A											3
County	State	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	Variance Measure*	Var Mean
Group 1													
Marion, Lake, Stearns, Somerset,	West Virginia California Minnesota Pennsylvania					0.598 0.845 0.984 0.774	0.599 0.897 0.956 0.798	0.621 0.956 0.929 0.815	0.648 1.028 0.901 0.840	0.687 1.051 0.882 0.868	0.724 1.059 0.846 0.916	0.039 0.046 0.030 0.034	
Group 2													
Clackamas, Winnebago, Ingham, Fayette,	Oregon Illinois Michigan Pennsylvania					0.878 0.810 1.107 0.734	0.886 0.827 1.102 0.765	0.897 0.828 1.108 0.812	0.916 0.806 1.101 0.858	0.926 0.797 1.081 0.913	0.938 0.808 1.081 0.974	0.013 0.015 0.007 0.058	
Group 3													
Pierce, Salt Lake, Montgomery, Clark,	Washington Utah Maryland Nevada					0.726 0.718 0.980 1.213	0.733 0.737 0.978 1.241	0.741 0.740 0.991 1.290	0.747 0.746 0.998 1.302	0.750 0.740 1.002 1.305	0.755 0.714 0.995 1.334	0.008 0.017 0.006 0.019	
Group 4													
Oakland, Fairfield, Essex, Hamilton,	Michigan Connecticut New Jersey Ohio					1.410 1.250 1.336 1.107	1.400 1.209 1.305 1.105	1.385 1.162 1.262 1.116	1.367 1.119 1.231 1.108	1.345 1.084 1.211 1.102	1.312 1.054 1.236 1.091	0.014 0.033 0.023 0.007	
Group 5													
Philadelphia, Wayne, Queens, Broward,	Pennsylvania Michigan New York Florida					1.295 1.513 1.347 1.124	1.360 1.571 1.287 1.143	1.421 1.580 1.253 1.122	1.456 1.589 1.210 1.111	1.505 1.564 1.170 1.121	1.562 1.540 1.157 1.142	0.038 0.016 0.030 0.015	
Group 6													
Cook, Los Angeles,	Illinois California					1.453 1.479	1.515 1.488	1.563 1.506	1.578 1.527	1.585 1.541	1.566 1.535	0.020 0.009	
Total	United States					1.000	1.000	1.000	1.000	1.000	1.000	0.000	

\* Average of (Absolute Value of (Annual % Changes in Geographic Index))

## APPENDIX A

## Analysis of Geographic Indices

## Five Year Average Geographical Indices

Coverage: Part B

County	State	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	Variance Measure*	3 Year Variance Measure*
Group 1													
Marion,	West Virginia					0.483	0.487	0.486	0.508	0.524	0.542	0.025	0.022
Lake,	California					1.333	1.411	1.382	1.378	1.370	1.374	0.018	0.003
Stearns,	Minnesota					0.720	0.724	0.729	0.718	0.720	0.719	0.006	0.002
Somerset,	Pennsylvania					0.561	0.571	0.578	0.591	0.617	0.633	0.024	0.023
Group 2													
Clackamas,	Oregon					0.983	0.951	0.903	0.864	0.825	0.793	0.042	0.028
Winnebago,	Illinois					0.821	0.801	0.806	0.794	0.790	0.798	0.012	0.005
Ingham,	Michigan					0.829	0.841	0.874	0.914	0.949	0.959	0.030	0.016
Fayette,	Pennsylvania					0.531	0.538	0.563	0.591	0.627	0.650	0.042	0.033
Group 3													
Pierce,	Washington					0.907	0.911	0.933	0.964	0.969	0.993	0.018	0.010
Salt Lake,	Utah					0.913	0.896	0.879	0.866	0.854	0.835	0.018	0.012
Montgomery,	Maryland					1.445	1.441	1.406	1.400	1.414	1.393	0.011	0.008
Clark,	Nevada					1.482	1.492	1.477	1.479	1.489	1.486	0.005	0.003
Group 4													
Oakland,	Michigan					1.381	1.408	1.463	1.536	1.597	1.602	0.030	0.014
Fairfield,	Connecticut					1.225	1.187	1.170	1.169	1.122	1.093	0.023	0.022
Essex,	New Jersey					1.333	1.319	1.335	1.300	1.286	1.282	0.013	0.005
Hamilton,	Ohio					0.818	0.840	0.837	0.861	0.870	0.905	0.022	0.017
Group 5													
Philadelphia,	Pennsylvania					1.505	1.505	1.514	1.523	1.545	1.575	0.009	0.011
Wayne,	Michigan					1.288	1.331	1.393	1.473	1.551	1.569	0.040	0.022
Queens,	New York					1.368	1.367	1.336	1.311	1.284	1.278	0.014	0.008
Broward,	Florida					1.698	1.697	1.694	1.677	1.663	1.638	0.007	0.008
Group 6													
Cook,	Illinois					1.025	1.022	1.047	1.072	1.114	1.083	0.024	0.023
Los Angeles,	California					1.772	1.788	1.786	1.785	1.791	1.781	0.004	0.003
Total	United States					1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.000

\* Average of (Absolute Value of (Annual % Changes in Geographic Index))

## APPENDIX A

## Analysis of Geographic Indices

## Six Year Average Geographical Indices

		Coverage: Part A										Variance Measure*	3 Year Variance Measure*
County	State	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983		
Group 1													
Marion,	West Virginia						0.610	0.616	0.639	0.660	0.706	0.038	0.047
Lake,	California						0.880	0.920	0.992	1.021	1.052	0.046	0.046
Stearns,	Minnesota						0.971	0.940	0.914	0.890	0.868	0.028	0.026
Somerset,	Pennsylvania						0.786	0.809	0.830	0.856	0.895	0.033	0.034
Group 2													
Clackamas,	Oregon						0.881	0.900	0.912	0.916	0.926	0.012	0.009
Winnebago,	Illinois						0.824	0.827	0.817	0.802	0.792	0.012	0.014
Ingham,	Michigan						1.108	1.110	1.096	1.090	1.079	0.008	0.009
Fayette,	Pennsylvania						0.755	0.794	0.844	0.884	0.937	0.055	0.057
Group 3													
Pierce,	Washington						0.729	0.736	0.744	0.748	0.753	0.008	0.008
Salt Lake,	Utah						0.725	0.735	0.739	0.740	0.724	0.010	0.009
Montgomery,	Maryland						0.983	0.987	0.992	0.994	0.998	0.004	0.004
Clark,	Nevada						1.236	1.266	1.310	1.307	1.286	0.020	0.018
Group 4													
Oakland,	Michigan						1.413	1.391	1.364	1.351	1.330	0.015	0.015
Fairfield,	Connecticut						1.227	1.187	1.142	1.103	1.072	0.033	0.033
Essex,	New Jersey						1.315	1.285	1.251	1.227	1.240	0.020	0.019
Hamilton,	Ohio						1.114	1.102	1.103	1.109	1.097	0.007	0.006
Group 5													
Philadelphia,	Pennsylvania						1.343	1.388	1.437	1.476	1.520	0.031	0.031
Wayne,	Michigan						1.545	1.571	1.568	1.565	1.549	0.007	0.005
Queens,	New York						1.307	1.271	1.242	1.198	1.169	0.027	0.027
Broward,	Florida						1.121	1.138	1.122	1.122	1.134	0.010	0.008
Group 6													
Cook,	Illinois						1.482	1.537	1.564	1.565	1.568	0.014	0.007
Los Angeles,	California						1.486	1.500	1.517	1.535	1.526	0.010	0.010
Total	United States						1.000	1.000	1.000	1.000	1.000	0.000	0.000

\* Average of (Absolute Value of (Annual % Changes in Geographic Index))

## APPENDIX A

## Analysis of Geographic Indices

## Six Year Average Geographical Indices

		Coverage: Part B										Variance Measure*	3 Year Variance Measure*
County	State	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983		
Group 1													
Marion,	West Virginia						0.491	0.486	0.497	0.513	0.539	0.029	0.028
Lake,	California						1.362	1.393	1.389	1.364	1.366	0.011	0.006
Stearns,	Minnesota						0.726	0.730	0.721	0.720	0.712	0.008	0.004
Somerset,	Pennsylvania						0.564	0.568	0.585	0.608	0.634	0.030	0.027
Group 2													
Clackamas,	Oregon						0.957	0.927	0.893	0.845	0.810	0.041	0.031
Winnebago,	Illinois						0.803	0.808	0.809	0.792	0.796	0.008	0.009
Ingham,	Michigan						0.841	0.874	0.887	0.925	0.944	0.029	0.021
Fayette,	Pennsylvania						0.535	0.549	0.576	0.607	0.649	0.049	0.041
Group 3													
Pierce,	Washington						0.901	0.932	0.949	0.974	0.975	0.020	0.009
Salt Lake,	Utah						0.906	0.890	0.876	0.856	0.842	0.018	0.013
Montgomery,	Maryland						1.452	1.415	1.401	1.410	1.405	0.011	0.004
Clark,	Nevada						1.488	1.485	1.488	1.486	1.474	0.003	0.003
Group 4													
Oakland,	Michigan						1.405	1.458	1.488	1.554	1.585	0.031	0.022
Fairfield,	Connecticut						1.218	1.171	1.158	1.150	1.106	0.024	0.015
Essex,	New Jersey						1.333	1.309	1.325	1.295	1.284	0.016	0.010
Hamilton,	Ohio						0.832	0.847	0.844	0.872	0.881	0.016	0.014
Group 5													
Philadelphia,	Pennsylvania						1.513	1.509	1.522	1.537	1.559	0.009	0.008
Wayne,	Michigan						1.319	1.383	1.422	1.500	1.548	0.041	0.029
Queens,	New York						1.353	1.349	1.315	1.312	1.291	0.011	0.006
Broward,	Florida						1.688	1.693	1.686	1.677	1.646	0.008	0.008
Group 6													
Cook,	Illinois						1.015	1.047	1.057	1.069	1.113	0.023	0.017
Los Angeles,	California						1.785	1.776	1.791	1.786	1.782	0.005	0.002
Total	United States						1.000	1.000	1.000	1.000	1.000	0.000	0.000

\* Average of (Absolute Value of (Annual % Changes in Geographic Index))

## APPENDIX A

## Analysis of Geographic Indices

## Seven Year Average Geographical Indices

		Coverage: Part A											3 Year
County	State	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	Variance Measure*	Variance Measure*
Group 1													
Marion,	West Virginia							0.623	0.632	0.650	0.680	0.030	0.030
Lake,	California							0.902	0.956	0.991	1.025	0.044	0.044
Stearns,	Minnesota							0.955	0.925	0.902	0.877	0.028	0.028
Somerset,	Pennsylvania							0.797	0.823	0.845	0.880	0.034	0.034
Group 2													
Clackamas,	Oregon							0.894	0.912	0.912	0.917	0.009	0.009
Winnebago,	Illinois							0.825	0.818	0.812	0.797	0.011	0.011
Ingham,	Michigan							1.114	1.100	1.087	1.087	0.008	0.008
Fayette,	Pennsylvania							0.782	0.824	0.868	0.908	0.051	0.051
Group 3													
Pierce,	Washington							0.733	0.739	0.745	0.751	0.008	0.008
Salt Lake,	Utah							0.726	0.735	0.734	0.726	0.008	0.008
Montgomery,	Maryland							0.990	0.988	0.989	0.992	0.002	0.002
Clark,	Nevada							1.257	1.287	1.313	1.291	0.020	0.020
Group 4													
Oakland,	Michigan							1.404	1.373	1.351	1.337	0.016	0.016
Fairfield,	Connecticut							1.206	1.167	1.125	1.090	0.033	0.033
Essex,	New Jersey							1.296	1.272	1.244	1.250	0.015	0.015
Hamilton,	Ohio							1.110	1.092	1.105	1.104	0.009	0.009
Group 5													
Philadelphia,	Pennsylvania							1.370	1.407	1.457	1.493	0.029	0.029
Wayne,	Michigan							1.548	1.561	1.550	1.552	0.005	0.005
Queens,	New York							1.291	1.259	1.226	1.193	0.026	0.026
Broward,	Florida							1.120	1.136	1.130	1.133	0.007	0.007
Group 6													
Cook,	Illinois							1.506	1.542	1.555	1.553	0.011	0.011
Los Angeles,	California							1.497	1.510	1.525	1.523	0.007	0.007
Total	United States							1.000	1.000	1.000	1.000	0.000	0.000

\* Average of (Absolute Value of (Annual % Changes in Geographic Index))

## APPENDIX A

## Analysis of Geographic Indices

## Seven Year Average Geographical Indices

		Coverage: Part B												3 Year
County	State	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	Variance Measure*	Variance Measure*	
Group 1														
Marion,	West Virginia							0.490	0.495	0.502	0.527	0.025	0.021	
Lake,	California							1.353	1.398	1.375	1.361	0.020	0.009	
Stearns,	Minnesota							0.731	0.724	0.723	0.712	0.008	0.005	
Somerset,	Pennsylvania							0.563	0.576	0.601	0.624	0.035	0.028	
Group 2														
Clackamas,	Oregon							0.936	0.915	0.872	0.829	0.039	0.032	
Winnebago,	Illinois							0.809	0.811	0.805	0.797	0.006	0.006	
Ingham,	Michigan							0.870	0.886	0.900	0.924	0.020	0.014	
Fayette,	Pennsylvania							0.545	0.563	0.592	0.629	0.049	0.038	
Group 3														
Pierce,	Washington							0.920	0.946	0.960	0.978	0.020	0.011	
Salt Lake,	Utah							0.899	0.885	0.865	0.845	0.020	0.015	
Montgomery,	Maryland							1.428	1.410	1.410	1.403	0.006	0.002	
Clark,	Nevada							1.462	1.493	1.493	1.473	0.007	0.004	
Group 4														
Oakland,	Michigan							1.448	1.480	1.510	1.550	0.023	0.016	
Fairfield,	Connecticut							1.200	1.161	1.144	1.133	0.019	0.008	
Essex,	New Jersey							1.323	1.304	1.317	1.292	0.014	0.010	
Hamilton,	Ohio							0.839	0.852	0.856	0.881	0.016	0.011	
Group 5														
Philadelphia,	Pennsylvania							1.515	1.516	1.534	1.550	0.008	0.007	
Wayne,	Michigan							1.365	1.409	1.452	1.505	0.033	0.022	
Queens,	New York							1.339	1.329	1.316	1.314	0.006	0.004	
Broward,	Florida							1.686	1.686	1.684	1.661	0.005	0.005	
Group 6														
Cook,	Illinois							1.038	1.056	1.057	1.074	0.011	0.006	
Los Angeles,	California							1.775	1.781	1.790	1.779	0.005	0.004	
Total	United States							1.000	1.000	1.000	1.000	0.000	0.000	

\* Average of (Absolute Value of (Annual % Changes in Geographic Index))



## APPENDIX A

## Analysis of Geographic Indices

Five Year Average Geographical Indices  
- Omit High and Low

		Coverage: Part A											3
County	State	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	Variance Measure*	Vari Meas
Group 1													
Marion,	West Virginia					0.600	0.600	0.626	0.662	0.697	0.717	0.036	0
Lake,	California					0.823	0.898	0.973	1.035	1.035	1.047	0.050	0
Stearns,	Minnesota					0.982	0.960	0.936	0.897	0.867	0.841	0.030	0
Somerset,	Pennsylvania					0.785	0.789	0.809	0.834	0.872	0.903	0.028	0
Group 2													
Clackamas,	Oregon					0.873	0.884	0.884	0.911	0.927	0.936	0.014	0
Winnebago,	Illinois					0.821	0.842	0.843	0.807	0.791	0.793	0.018	0
Ingham,	Michigan					1.109	1.103	1.107	1.106	1.074	1.074	0.008	0
Fayette,	Pennsylvania					0.732	0.753	0.794	0.851	0.934	0.984	0.061	0
Group 3													
Pierce,	Washington					0.726	0.735	0.742	0.747	0.750	0.754	0.008	0
Salt Lake,	Utah					0.716	0.737	0.743	0.744	0.741	0.722	0.014	0
Montgomery,	Maryland					0.977	0.975	0.990	1.001	1.001	0.990	0.008	0
Clark,	Nevada					1.223	1.270	1.338	1.351	1.355	1.355	0.021	0
Group 4													
Oakland,	Michigan					1.407	1.407	1.383	1.382	1.346	1.293	0.017	0
Fairfield,	Connecticut					1.256	1.206	1.157	1.119	1.079	1.049	0.035	0
Essex,	New Jersey					1.339	1.306	1.259	1.222	1.203	1.203	0.021	0
Hamilton,	Ohio					1.115	1.115	1.118	1.118	1.108	1.090	0.006	0
Group 5													
Philadelphia,	Pennsylvania					1.302	1.329	1.402	1.461	1.543	1.564	0.037	0
Wayne,	Michigan					1.518	1.563	1.578	1.578	1.556	1.515	0.016	0
Queens,	New York					1.366	1.310	1.253	1.202	1.170	1.163	0.032	0
Broward,	Florida					1.132	1.136	1.115	1.113	1.113	1.137	0.009	0
Group 6													
Cook,	Illinois					1.456	1.514	1.568	1.592	1.592	1.567	0.021	0
Los Angeles,	California					1.475	1.485	1.502	1.528	1.550	1.550	0.010	0
Total	United States					1.000	1.000	1.000	1.000	1.000	1.000	0.000	0

\* Average of (Absolute Value of (Annual % Changes in Geographic Index))

## APPENDIX A

## Analysis of Geographic Indices

Five Year Average Geographical Indices  
- Omit High and Low

## Coverage: Part B

County	State	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	Variance Measure*	3 Year Variance Measure*
Group 1													
Marion,	West Virginia					0.484	0.488	0.486	0.511	0.531	0.540	0.024	0.019
Lake,	California					1.366	1.408	1.366	1.361	1.351	1.357	0.015	0.004
Stearns,	Minnesota					0.729	0.731	0.737	0.718	0.722	0.722	0.008	0.002
Somerset,	Pennsylvania					0.550	0.566	0.566	0.587	0.612	0.631	0.028	0.024
Group 2													
Clackamas,	Oregon					0.989	0.960	0.891	0.857	0.826	0.794	0.043	0.025
Winnebago,	Illinois					0.812	0.802	0.811	0.804	0.797	0.811	0.011	0.009
Ingham,	Michigan					0.838	0.850	0.858	0.908	0.944	0.949	0.025	0.015
Fayette,	Pennsylvania					0.511	0.522	0.557	0.601	0.630	0.647	0.048	0.025
Group 3													
Pierce,	Washington					0.895	0.895	0.919	0.970	0.979	1.019	0.027	0.017
Salt Lake,	Utah					0.913	0.891	0.872	0.866	0.863	0.840	0.017	0.010
Montgomery,	Maryland					1.442	1.442	1.420	1.410	1.434	1.399	0.013	0.014
Clark,	Nevada					1.487	1.504	1.479	1.479	1.495	1.495	0.008	0.004
Group 4													
Oakland,	Michigan					1.386	1.424	1.455	1.546	1.592	1.593	0.028	0.010
Fairfield,	Connecticut					1.215	1.179	1.155	1.153	1.124	1.084	0.022	0.020
Essex,	New Jersey					1.346	1.322	1.322	1.322	1.279	1.272	0.011	0.008
Hamilton,	Ohio					0.811	0.847	0.842	0.882	0.887	0.904	0.024	0.008
Group 5													
Philadelphia,	Pennsylvania					1.497	1.497	1.513	1.525	1.547	1.572	0.010	0.010
Wayne,	Michigan					1.277	1.340	1.386	1.493	1.558	1.576	0.043	0.019
Queens,	New York					1.370	1.370	1.324	1.297	1.284	1.284	0.013	0.003
Broward,	Florida					1.701	1.701	1.695	1.668	1.663	1.651	0.006	0.003
Group 6													
Cook,	Illinois					1.006	1.000	1.042	1.084	1.113	1.090	0.027	0.016
Los Angeles,	California					1.772	1.787	1.787	1.786	1.795	1.779	0.005	0.005
Total	United States					1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.000

\* Average of (Absolute Value of (Annual % Changes in Geographic Index))

## APPENDIX A

## Analysis of Geographic Indices

Six Year Average Geographical Indices  
- Omit High and Low

		Coverage: Part A										Variance Measure*	3 Year Variance Measure*
County	State	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983		
Group 1													
Marion, Lake, Stearns, Somerset,	West Virginia						0.616	0.618	0.645	0.677	0.705	0.035	0.045
	California						0.872	0.932	0.993	1.022	1.039	0.045	0.037
	Minnesota						0.969	0.947	0.916	0.882	0.858	0.030	0.032
	Pennsylvania						0.787	0.802	0.823	0.852	0.888	0.031	0.034
Group 2													
Clackamas, Winnebago, Ingham, Fayette,	Oregon						0.879	0.892	0.906	0.912	0.926	0.013	0.013
	Illinois						0.834	0.838	0.823	0.800	0.786	0.017	0.021
	Michigan						1.111	1.111	1.097	1.089	1.073	0.009	0.012
	Pennsylvania						0.742	0.780	0.831	0.888	0.954	0.065	0.069
Group 3													
Pierce, Salt Lake, Montgomery, Clark,	Washington						0.729	0.738	0.745	0.748	0.752	0.008	0.006
	Utah						0.728	0.735	0.740	0.740	0.732	0.007	0.006
	Maryland						0.983	0.984	0.991	0.994	0.995	0.003	0.004
	Nevada						1.254	1.290	1.350	1.346	1.315	0.026	0.025
Group 4													
Oakland, Fairfield, Essex, Hamilton,	Michigan						1.413	1.393	1.374	1.354	1.325	0.016	0.017
	Connecticut						1.233	1.183	1.138	1.100	1.065	0.036	0.034
	New Jersey						1.320	1.281	1.243	1.218	1.218	0.020	0.017
	Ohio						1.124	1.108	1.108	1.117	1.098	0.010	0.009
Group 5													
Philadelphia, Wayne, Queens, Broward,	Pennsylvania						1.313	1.380	1.432	1.490	1.553	0.043	0.040
	Michigan						1.538	1.564	1.560	1.560	1.536	0.009	0.006
	New York						1.332	1.280	1.236	1.185	1.170	0.032	0.030
	Florida						1.125	1.130	1.117	1.117	1.129	0.007	0.008
Group 6													
Cook, Los Angeles,	Illinois						1.487	1.542	1.568	1.569	1.569	0.014	0.006
	California						1.482	1.494	1.516	1.538	1.533	0.010	0.011
Total	United States						1.000	1.000	1.000	1.000	1.000	0.000	0.000

\* Average of (Absolute Value of (Annual % Changes in Geographic Index))

## APPENDIX A

## Analysis of Geographic Indices

Six Year Average Geographical Indices  
- Omit High and Low

		Coverage: Part B										Variance Measure*	3 Year Variance Measure*
County	State	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983		
Group 1													
Marion,	West Virginia						0.494	0.486	0.497	0.518	0.536	0.029	0.025
Lake,	California						1.387	1.387	1.381	1.347	1.349	0.008	0.009
Stearns,	Minnesota						0.732	0.737	0.724	0.721	0.710	0.011	0.006
Somerset,	Pennsylvania						0.557	0.563	0.579	0.600	0.633	0.033	0.030
Group 2													
Clackamas,	Oregon						0.967	0.927	0.879	0.844	0.806	0.044	0.028
Winnebago,	Illinois						0.806	0.813	0.814	0.798	0.805	0.010	0.009
Ingham,	Michigan						0.848	0.863	0.882	0.926	0.937	0.025	0.021
Fayette,	Pennsylvania						0.522	0.544	0.578	0.611	0.645	0.054	0.038
Group 3													
Pierce,	Washington						0.890	0.921	0.947	0.984	0.985	0.026	0.013
Salt Lake,	Utah						0.903	0.885	0.869	0.864	0.848	0.016	0.008
Montgomery,	Maryland						1.454	1.430	1.410	1.423	1.414	0.012	0.005
Clark,	Nevada						1.494	1.490	1.493	1.489	1.475	0.004	0.004
Group 4													
Oakland,	Michigan						1.415	1.449	1.494	1.570	1.575	0.027	0.018
Fairfield,	Connecticut						1.207	1.161	1.141	1.139	1.107	0.021	0.010
Essex,	New Jersey						1.344	1.306	1.311	1.293	1.277	0.014	0.009
Hamilton,	Ohio						0.833	0.856	0.851	0.886	0.898	0.022	0.018
Group 5													
Philadelphia,	Pennsylvania						1.511	1.506	1.523	1.534	1.561	0.010	0.008
Wayne,	Michigan						1.318	1.373	1.431	1.529	1.552	0.042	0.028
Queens,	New York						1.348	1.346	1.308	1.302	1.295	0.010	0.003
Broward,	Florida						1.686	1.693	1.683	1.669	1.657	0.006	0.005
Group 6													
Cook,	Illinois						0.996	1.044	1.059	1.077	1.111	0.028	0.016
Los Angeles,	California						1.783	1.772	1.794	1.786	1.781	0.007	0.002
Total	United States						1.000	1.000	1.000	1.000	1.000	0.000	0.000

\* Average of (Absolute Value of (Annual % Changes in Geographic Index))

## APPENDIX A

## Analysis of Geographic Indices

Seven Year Average Geographical Indices  
- Omit High and Low

		Coverage: Part A											
County	State	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	Variance Measure*	3 Year Variance Measure*
Group 1													
Marion,	West Virginia							0.627	0.635	0.660	0.687	0.031	0.031
Lake,	California							0.904	0.956	0.991	1.028	0.044	0.044
Stearns,	Minnesota							0.956	0.929	0.901	0.872	0.030	0.030
Somerset,	Pennsylvania							0.798	0.815	0.840	0.869	0.029	0.029
Group 2													
Clackamas,	Oregon							0.886	0.908	0.907	0.914	0.011	0.011
Winnebago,	Illinois							0.833	0.824	0.815	0.794	0.016	0.016
Ingham,	Michigan							1.116	1.102	1.085	1.085	0.009	0.009
Fayette,	Pennsylvania							0.766	0.812	0.865	0.913	0.060	0.060
Group 3													
Pierce,	Washington							0.733	0.741	0.746	0.750	0.008	0.008
Salt Lake,	Utah							0.728	0.734	0.733	0.733	0.003	0.003
Montgomery,	Maryland							0.989	0.986	0.987	0.991	0.003	0.003
Clark,	Nevada							1.273	1.310	1.347	1.315	0.027	0.027
Group 4													
Oakland,	Michigan							1.400	1.384	1.353	1.335	0.016	0.016
Fairfield,	Connecticut							1.209	1.162	1.119	1.084	0.036	0.036
Essex,	New Jersey							1.298	1.264	1.236	1.236	0.016	0.016
Hamilton,	Ohio							1.116	1.093	1.109	1.108	0.012	0.012
Group 5													
Philadelphia,	Pennsylvania							1.356	1.408	1.461	1.509	0.036	0.036
Wayne,	Michigan							1.544	1.552	1.540	1.543	0.005	0.005
Queens,	New York							1.304	1.261	1.216	1.182	0.032	0.032
Broward,	Florida							1.122	1.129	1.129	1.129	0.002	0.002
Group 6													
Cook,	Illinois							1.515	1.548	1.555	1.552	0.009	0.009
Los Angeles,	California							1.490	1.507	1.527	1.527	0.008	0.008
Total	United States							1.000	1.000	1.000	1.000	0.000	0.000

\* Average of (Absolute Value of (Annual % Changes in Geographic Index))

## APPENDIX A

## Analysis of Geographic Indices

Seven Year Average Geographical Indices  
- Omit High and Low

## Coverage: Part B

County	State	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	Variance Measure*	3 Year Variance Measure*
Group 1													
Marion,	West Virginia							0.491	0.495	0.506	0.524	0.022	0.019
Lake,	California							1.371	1.395	1.366	1.346	0.018	0.012
Stearns,	Minnesota							0.736	0.726	0.725	0.712	0.011	0.007
Somerset,	Pennsylvania							0.557	0.574	0.591	0.619	0.036	0.025
Group 2													
Clackamas,	Oregon							0.939	0.910	0.864	0.825	0.042	0.032
Winnebago,	Illinois							0.813	0.815	0.808	0.804	0.005	0.005
Ingham,	Michigan							0.859	0.881	0.901	0.924	0.025	0.016
Fayette,	Pennsylvania							0.539	0.563	0.591	0.627	0.052	0.037
Group 3													
Pierce,	Washington							0.911	0.942	0.963	0.987	0.027	0.016
Salt Lake,	Utah							0.896	0.879	0.866	0.851	0.017	0.011
Montgomery,	Maryland							1.441	1.420	1.420	1.410	0.007	0.002
Clark,	Nevada							1.485	1.499	1.498	1.474	0.008	0.005
Group 4													
Oakland,	Michigan							1.437	1.481	1.523	1.561	0.028	0.018
Fairfield,	Connecticut							1.187	1.149	1.132	1.122	0.018	0.008
Essex,	New Jersey							1.327	1.300	1.302	1.289	0.010	0.004
Hamilton,	Ohio							0.843	0.861	0.861	0.895	0.020	0.013
Group 5													
Philadelphia,	Pennsylvania							1.515	1.515	1.530	1.548	0.007	0.007
Wayne,	Michigan							1.349	1.412	1.472	1.530	0.043	0.027
Queens,	New York							1.333	1.329	1.310	1.307	0.006	0.005
Broward,	Florida							1.683	1.683	1.681	1.663	0.004	0.004
Group 6													
Cook,	Illinois							1.032	1.057	1.058	1.083	0.016	0.008
Los Angeles,	California							1.772	1.780	1.792	1.776	0.007	0.005
Total	United States							1.000	1.000	1.000	1.000	0.000	0.000

\* Average of (Absolute Value of (Annual % Changes in Geographic Index))

Appendix B  
Demographic Factors Used by HCFA  
1984-1987

Table B-1  
1987 Demographic Cost Factors for the Aged

Sex & Age Group	Institutionalized	Non-Institutionalized	Non-Institutionalized
		Medicaid	Non-Medicaid
Part A -- Hospital Insurance			
Male:			
65 - 69	2.05	1.35	.70
70 - 74	2.30	1.70	.90
75 - 79	2.35	2.05	1.10
80 - 84	2.35	2.25	1.15
85 and over	2.35	2.25	1.15
Female:			
65 - 69	1.65	.90	.60
70 - 74	1.90	1.15	.70
75 - 79	1.95	1.40	.85
80 - 84	1.95	1.60	1.00
85 and over	1.95	1.85	1.05

Part B -- Supplementary Medical Insurance

Male:			
65 - 69	1.70	1.15	.80
70 - 74	1.90	1.45	1.00
75 - 79	1.90	1.60	1.10
80 - 84	1.90	1.60	1.10
85 and over	1.90	1.60	1.10
Female:			
65 - 69	1.50	1.05	.70
70 - 74	1.65	1.15	.85
75 - 79	1.70	1.25	.95
80 - 84	1.70	1.25	.95
85 and over	1.70	1.25	1.00



Table B-2  
1987 Demographic Cost Factors for the Disabled

<u>Sex &amp; Age Group</u>	<u>Institutionalized</u>	<u>Non-Institutionalized</u>	<u>Non-Institutionalized</u>
		<u>Medicaid</u>	<u>Non-Medicaid</u>
		<u>Part A -- Hospital Insurance</u>	
Male:			
Under 35	1.50	.95	
35 - 44	1.20	1.00	.55
45 - 54	1.15	1.35	.55
55 - 59	.90	1.55	.70
60 - 64	.55	1.70	.85
			.90

Female:

Under 35	1.65	1.15	
35 - 44	1.50	1.25	.50
45 - 54	1.40	1.40	.65
55 - 59	1.00	1.40	.90
60 - 64	.60	1.40	1.00
			1.15

Part B -- Supplementary Medical Insurance

Male:

Under 35	1.50	.95	
35 - 44	1.35	1.00	.40
45 - 54	1.30	1.25	.50
55 - 59	1.15	1.35	.65
60 - 64	.90	1.40	.80
			.90

Female:

Under 35	1.75	.90	
35 - 44	1.75	1.15	.65
45 - 54	1.75	1.30	.80
55 - 59	1.40	1.40	1.00
60 - 64	1.10	1.45	1.10
			1.15

Table B-3  
1986 Demographic Cost Factors for the Aged

<u>Sex &amp; Age Group</u>	<u>Institutionalized</u>	Non-Institutionalized	Non-Institutionalized
		<u>Medicaid</u>	<u>Non-Medicaid</u>
		<u>Part A -- Hospital Insurance</u>	
Male:			
65 - 69	1.95	1.30	.70
70 - 74	2.35	1.65	.85
75 - 79	2.35	2.05	1.10
80 - 84	2.35	2.35	1.20
85 and over	2.35	2.35	1.20

Female:			
65 - 69	1.65	.90	.60
70 - 74	1.90	1.15	.70
75 - 79	2.00	1.40	.85
80 - 84	2.00	1.65	1.00
85 and over	2.00	1.90	1.10

Part B -- Supplementary Medical Insurance

Male:			
65 - 69	1.70	1.20	.85
70 - 74	1.90	1.45	1.00
75 - 79	1.90	1.60	1.10
80 - 84	1.90	1.60	1.10
85 and over	1.90	1.60	1.10

Female:			
65 - 69	1.50	1.05	.70
70 - 74	1.65	1.20	.85
75 - 79	1.65	1.20	.95
80 - 84	1.65	1.20	.95
85 and over	1.65	1.20	.95

Table B-4  
1986 Demographic Cost Factors for the Disabled

Sex & Age Group	Institutionalized	Non-Institutionalized	Non-Institutionalized
		Medicaid	Non-Medicaid
		Part A -- Hospital Insurance	
Male:			
Under 35	1.50	.95	.55
35 - 44	1.25	1.05	.60
45 - 54	1.15	1.30	.70
55 - 59	.80	1.45	.75
60 - 64	.50	1.65	.85

**Female:**

Under 35	1.70	1.20	.50
35 - 44	1.60	1.35	.70
45 - 54	1.45	1.45	.95
55 - 59	1.00	1.45	1.00
60 - 64	.65	1.45	1.20

Part B -- Supplementary Medical Insurance

**Male:**

Under 35	1.50	.95	.40
35 - 44	1.40	1.05	.50
45 - 54	1.35	1.25	.65
55 - 59	1.10	1.30	.75
60 - 64	.90	1.40	.90

**Female:**

Under 35	1.80	.95	.65
35 - 44	1.80	1.10	.80
45 - 54	1.80	1.35	1.05
55 - 59	1.40	1.40	1.10
60 - 64	1.10	1.45	1.15

Table B-5  
1985 Demographic Cost Factors for the Aged

Sex & Age Group	Institutionalized	Non-Institutionalized	Non-Institutionalized
		Medicaid	Non-Medicaid
		Part A -- Hospital Insurance	
Male:			
65 - 69	2.00	1.35	.70
70 - 74	2.25	1.65	.85
75 - 79	2.25	2.00	1.05
80 - 84	2.25	2.25	1.15
85 and over	2.25	2.30	1.20

Female:			
65 - 69	1.70	.90	.60
70 - 74	1.90	1.15	.70
75 - 79	2.00	1.45	.85
80 - 84	2.00	1.70	1.05
85 and over	2.00	1.85	1.10

Part B -- Supplementary Medical Insurance

Male:			
65 - 69	1.75	1.25	.85
70 - 74	1.80	1.45	1.00
75 - 79	1.80	1.55	1.10
80 - 84	1.80	1.60	1.10
85 and over	1.80	1.60	1.10

Female:			
65 - 69	1.55	1.10	.70
70 - 74	1.60	1.15	.85
75 - 79	1.60	1.20	.95
80 - 84	1.60	1.20	.95
85 and over	1.60	1.20	.95

Table B-6  
1985 Demographic Cost Factors for the Disabled

Sex & Age Group	Institutionalized	Non-Institutionalized	Non-Institutionalized
		Medicaid	Non-Medicaid
		Part A -- Hospital Insurance	
Male:			
Under 35	1.45	.90	.50
35 - 44	1.20	1.05	.55
45 - 54	1.10	1.30	.65
55 - 59	.80	1.40	.75
60 - 64	.55	1.70	.90

Female:

Under 35	1.65	1.15	.50
35 - 44	1.50	1.30	.65
45 - 54	1.45	1.45	.95
55 - 59	1.00	1.45	1.00
60 - 64	.65	1.50	1.25

Part B -- Supplementary Medical Insurance

Male:

Under 35	1.35	.90	.35
35 - 44	1.35	1.00	.50
45 - 54	1.30	1.25	.65
55 - 59	1.10	1.30	.75
60 - 64	.90	1.45	.90

Female:

Under 35	1.75	.90	.65
35 - 44	1.75	1.10	.80
45 - 54	1.75	1.30	1.00
55 - 59	1.40	1.40	1.10
60 - 64	1.15	1.50	1.20

Table B-7  
1984 and Prior Demographic Cost Factors for the Aged

Sex & Age Group	Institutionalized	Non-Institutionalized	
		Welfare	Non-Welfare
		Part A -- Hospital Insurance	
Male:			
65 - 69	2.05	1.35	.70
70 - 74	2.15	1.55	.80
75 - 79	2.35	1.95	1.00
80 - 84	2.35	2.30	1.20
85 and over	2.35	2.60	1.35
Female:			
65 - 69	1.65	.90	.60
70 - 74	1.90	1.15	.70
75 - 79	2.20	1.50	.90
80 - 84	2.20	1.80	1.10
85 and over	2.20	2.15	1.25
Part B -- Supplementary Medical Insurance			
Male:			
65 - 69	1.75	1.20	.85
70 - 74	1.90	1.40	1.00
75 - 79	1.90	1.55	1.10
80 - 84	1.90	1.70	1.15
85 and over	1.90	1.70	1.15
Female:			
65 - 69	1.55	1.10	.70
70 - 74	1.60	1.15	.80
75 - 79	1.70	1.25	.95
80 - 84	1.70	1.25	1.00
85 and over	1.70	1.25	1.05

Table B-8  
1984 and Prior Demographic Cost Factors for the Disabled

Sex & Age Group	Institutionalized	Non-Institutionalized	Non-Institutionalized
		Welfare	Non-Welfare
Part A — Hospital Insurance			
Male:			
Under 35	1.20	.75	.40
35 - 44	1.10	.95	.50
45 - 54	1.00	1.15	.60
55 - 59	.90	1.60	.85
60 - 64	.55	1.75	.95
Female:			
Under 35	1.40	1.00	.40
35 - 44	1.45	1.20	.65
45 - 54	1.55	1.55	1.00
55 - 59	1.15	1.60	1.15
60 - 64	.60	1.45	1.20

Part B -- Supplementary Medical Insurance

Male:			
Under 35	1.10	.70	.30
35 - 44	1.15	.85	.40
45 - 54	1.15	1.10	.55
55 - 60	1.15	1.35	.80
60 - 64	.95	1.45	.95
Female:			
Under 35	1.40	.75	.50
35 - 44	1.75	1.10	.80
45 - 54	1.95	1.50	1.15
55 - 60	1.60	1.60	1.25
60 - 64	1.15	1.55	1.25

Appendix C  
Calculation of 1987  
Average Demographic Factors

This appendix calculates the average demographic factors for 1987 based on national populations by age and sex provided by HCFA. A summary of the average factors for all Medicare enrollees is as follows:

	<u>Part A</u>	<u>Part B</u>
Aged	.9403	.9724
Disabled	.9362	.9421



## Appendix C

## TOTAL POPULATION (HCFA NATIONAL DATA - 1987 AAPCC)

AGED - PART A	INSTI-TUTIONAL	WELFARE	NON-INST'NL NON-WELFARE
MALE			
65 - 69	49,643.0	125,361.0	3,753,262.0
70 - 74	58,099.0	143,301.0	2,876,285.0
75 - 79	66,068.0	132,049.0	1,874,476.0
80 - 84	68,607.0	113,064.0	1,024,428.0
85+	99,661.0	83,224.0	696,679.0
FEMALE			
65 - 69	58,859.0	329,189.0	4,385,620.0
70 - 74	94,839.0	367,163.0	3,699,728.0
75 - 79	152,227.0	337,980.0	2,796,299.0
80 - 84	210,884.0	321,057.0	1,847,391.0
85+	369,306.0	416,440.0	1,546,888.0
SUM	1,228,193.0	2,368,828.0	24,501,056.0
GRAND SUM			28,098,077.0

AGED - PART B	INSTI-TUTIONAL	WELFARE	NON-INST'NL NON-WELFARE
MALE			
65 - 69	53,763.0	151,984.0	3,624,084.0
70 - 74	62,579.0	181,070.0	2,812,754.0
75 - 79	70,842.0	162,162.0	1,835,736.0
80 - 84	72,842.0	117,608.0	1,004,735.0
85+	105,742.0	82,288.0	652,498.0
FEMALE			
65 - 69	64,309.0	403,466.0	4,304,761.0
70 - 74	103,018.0	467,673.0	3,654,361.0
75 - 79	164,396.0	425,603.0	2,770,141.0
80 - 84	225,445.0	338,958.0	1,825,578.0
85+	395,604.0	409,200.0	1,481,523.0
SUM	1,318,740.0	2,740,010.0	23,966,171.0
GRAND SUM			28,024,921.0

## NATIONAL COMPOSITE DEMOGRAPHIC FACTORS - SUMMARY

	PART A	PART B
AGED	0.9403	0.9724
DISABLED	0.9362	0.9421

## DEMOGRAPHIC COST FACTORS

AGED - PART A	INSTI-TUTIONAL	WELFARE	NON-INST'NL NON-WELFARE
MALE			
65 - 69	2.05	1.35	0.70
70 - 74	2.30	1.70	0.90
75 - 79	2.35	2.05	1.10
80 - 84	2.35	2.25	1.15
85+	2.35	2.25	1.15
FEMALE			
65 - 69	1.65	0.90	0.60
70 - 74	1.90	1.15	0.70
75 - 79	1.95	1.40	0.85
80 - 84	1.95	1.60	1.00
85+	1.95	1.85	1.05

NATIONAL COMPOSITE FACTOR

0.9403

AGED - PART B	INSTI-TUTIONAL	WELFARE	NON-INST'NL NON-WELFARE
MALE			
65 - 69	1.70	1.15	0.80
70 - 74	1.90	1.45	1.00
75 - 79	1.90	1.60	1.10
80 - 84	1.90	1.60	1.10
85+	1.90	1.60	1.10
FEMALE			
65 - 69	1.50	1.05	0.70
70 - 74	1.65	1.15	0.85
75 - 79	1.70	1.25	0.95
80 - 84	1.70	1.25	0.95
85+	1.70	1.25	1.00

NATIONAL COMPOSITE FACTOR

0.9724

## PRODUCT OF (POPULATION \* FACTORS)

AGED - PART A	INSTI-TUTIONAL	WELFARE	NON-INST'NL NON-WELFARE
MALE			
65 - 69	101,768.2	169,237.4	2,627,283.4
70 - 74	133,627.7	243,611.7	2,588,656.5
75 - 79	155,259.8	270,700.4	2,061,923.6
80 - 84	161,226.5	254,394.0	1,178,092.2
85+	234,203.4	187,254.0	801,180.9
FEMALE			
65 - 69	97,117.3	296,270.1	2,631,372.0
70 - 74	180,194.1	422,237.4	2,589,809.6
75 - 79	296,842.6	473,172.0	2,376,854.2
80 - 84	411,223.8	513,691.2	1,847,391.0
85+	720,146.7	770,414.0	1,624,232.4

SUM

2,491,610.1

3,600,982.3

20,326,795.7

GRAND SUM

26,419,388.0

AGED - PART B	INSTI-TUTIONAL	WELFARE	NON-INST'NL NON-WELFARE
MALE			
65 - 69	91,397.1	174,781.6	2,899,267.2
70 - 74	118,900.1	262,551.5	2,812,754.0
75 - 79	134,599.8	259,459.2	2,019,309.6
80 - 84	138,399.8	188,172.8	1,105,208.5
85+	200,909.8	171,660.8	717,747.8
FEMALE			
65 - 69	96,463.5	423,639.3	3,013,332.7
70 - 74	169,979.7	537,824.0	3,106,206.9
75 - 79	279,813.2	532,003.8	2,631,633.9
80 - 84	383,256.5	423,695.0	1,734,299.1
85+	672,526.8	511,500.0	1,481,523.0

SUM

2,286,246.3

3,445,287.9

21,521,282.7

GRAND SUM

27,252,816.9

## Appendix C

## TOTAL POPULATION (HCFA NATIONAL DATA - 1987 AAPCC)

D1 - PART A	INSTI-TUTIONAL	WELFARE	NON-INST'NL NON-WELFARE
MALE			
<35	32,615.0	96,415.0	155,169.0
35 - 44	26,983.0	62,611.0	214,265.0
45 - 54	30,914.0	61,449.0	317,598.0
55 - 59	19,730.0	38,939.0	320,644.0
60 - 64	21,369.0	43,235.0	508,681.9
FEMALE			
<35	19,596.0	65,998.0	68,494.0
35 - 44	19,213.0	45,116.0	97,956.0
45 - 54	21,355.0	57,682.0	143,779.0
55 - 59	15,709.0	54,446.0	164,126.0
60 - 64	13,777.0	76,257.0	274,827.3
SUM			
GRAND SUM	221,261.0	602,148.0	2,265,540.2 3,088,949.2

## DEMOGRAPHIC COST FACTORS

D1 - PART A	INSTI-TUTIONAL	WELFARE	NON-INST'NL NON-WELFARE
MALE			
<35	1.50	0.95	0.55
35 - 44	1.20	1.00	0.55
45 - 54	1.15	1.35	0.70
55 - 59	0.90	1.55	0.85
60 - 64	0.55	1.70	0.90
FEMALE			
<35	1.65	1.15	0.50
35 - 44	1.50	1.25	0.65
45 - 54	1.40	1.40	0.90
55 - 59	1.00	1.40	1.00
60 - 64	0.60	1.40	1.15

NATIONAL COMPOSITE FACTOR

0.9362

## PRODUCT OF (POPULATION \* FACTORS)

D1 - PART A	INSTI-TUTIONAL	WELFARE	NON-INST'NL NON-WELFARE
MALE			
<35	48,922.5	91,594.3	85,343.0
35 - 44	32,379.6	62,611.0	117,845.8
45 - 54	35,551.1	82,956.2	222,318.6
55 - 59	17,757.0	60,355.5	272,547.4
60 - 64	11,753.0	73,499.5	457,813.7
FEMALE			
<35	32,333.4	75,897.7	34,247.0
35 - 44	28,819.5	56,395.0	83,671.4
45 - 54	29,897.0	80,754.8	129,401.1
55 - 59	15,709.0	76,224.4	164,126.0
60 - 64	8,266.2	106,759.8	316,051.3
SUM			
GRAND SUM	261,388.3	767,048.0	1,863,365.3 2,891,801.6

D1 - PART B	INSTI-TUTIONAL	WELFARE	NON-INST'NL NON-WELFARE
MALE			
<35	30,015.0	96,308.0	135,400.0
35 - 44	24,269.0	62,611.0	186,804.0
45 - 54	27,881.0	61,448.0	280,927.0
55 - 59	17,912.0	38,939.0	288,706.0
60 - 64	19,603.0	43,235.0	465,092.9
FEMALE			
<35	18,296.0	65,849.0	59,767.0
35 - 44	17,713.0	45,072.0	87,013.0
45 - 54	19,730.0	57,676.0	128,502.0
55 - 59	14,754.0	54,444.0	150,861.0
60 - 64	13,163.0	76,241.0	259,913.6
SUM			
GRAND SUM	203,336.0	601,823.0	2,042,986.5 2,848,145.5

D1 - PART B	INSTI-TUTIONAL	WELFARE	NON-INST'NL NON-WELFARE
MALE			
<35	1.50	0.95	0.40
35 - 44	1.35	1.00	0.50
45 - 54	1.30	1.25	0.65
55 - 59	1.15	1.35	0.80
60 - 64	0.90	1.40	0.90
FEMALE			
<35	1.75	0.90	0.65
35 - 44	1.75	1.15	0.80
45 - 54	1.75	1.30	1.00
55 - 59	1.40	1.40	1.10
60 - 64	1.10	1.45	1.15

NATIONAL COMPOSITE FACTOR

0.9421

D1 - PART B	INSTI-TUTIONAL	WELFARE	NON-INST'NL NON-WELFARE
MALE			
<35	45,022.5	91,492.6	54,160.0
35 - 44	32,763.2	62,611.0	93,402.0
45 - 54	36,245.3	76,810.0	182,606.6
55 - 59	20,598.8	52,567.7	230,964.8
60 - 64	17,642.7	60,529.0	418,583.6
FEMALE			
<35	32,018.0	59,264.1	38,848.6
35 - 44	30,997.8	51,832.8	69,610.4
45 - 54	34,527.5	74,978.8	128,502.0
55 - 59	20,655.6	76,221.6	165,947.1
60 - 64	14,479.3	110,549.5	298,900.6
SUM			
GRAND SUM	284,950.6	716,857.0	1,681,521.6 2,683,329.2

## Appendix C

## NON-HMO POPULATION (HCFA NATIONAL DATA - 1987 AAPCC)

AGED - PART A	INSTI-TUTIONAL	WELFARE	NON-INST'NL NON-WELFARE
MALE			
65 - 69	49,643	124,030	3,597,531
70 - 74	58,099	141,831	2,747,122
75 - 79	66,068	130,719	1,792,495
80 - 84	68,607	111,977	981,575
85+	99,661	82,498	673,540
FEMALE			
65 - 69	58,859	325,816	4,203,107
70 - 74	94,839	363,350	3,549,670
75 - 79	152,227	334,621	2,693,695
80 - 84	210,884	318,096	1,788,284
85+	369,306	413,066	1,510,052
SUM	1,228,193	2,346,004	23,537,071
GRAND SUM			27,111,268

AGED - PART B	INSTI-TUTIONAL	WELFARE	NON-INST'NL NON-WELFARE
MALE			
65 - 69	53,763	150,532	3,467,664
70 - 74	62,579	179,395	2,683,000
75 - 79	70,842	160,605	1,753,347
80 - 84	72,842	116,449	961,730
85+	105,742	81,549	629,328
FEMALE			
65 - 69	64,309	399,598	4,121,149
70 - 74	103,018	463,075	3,503,476
75 - 79	164,596	421,569	2,666,915
80 - 84	225,445	335,776	1,766,233
85+	395,604	405,808	1,444,636
SUM	1,318,740	2,714,356	22,997,478
GRAND SUM			27,030,574

## NATIONAL COMPOSITE DEMOGRAPHIC FACTORS - SUMMARY

	PART A	PART B
AGED	0.9440	0.9750
DISABLED	0.9365	0.9427

## DEMOGRAPHIC COST FACTORS

AGED - PART A	INSTI-TUTIONAL	WELFARE	NON-INST'NL NON-WELFARE
MALE			
65 - 69	2.05	1.35	0.70
70 - 74	2.30	1.70	0.90
75 - 79	2.35	2.05	1.10
80 - 84	2.35	2.25	1.15
85+	2.35	2.25	1.15
FEMALE			
65 - 69	1.65	0.90	0.60
70 - 74	1.90	1.15	0.70
75 - 79	1.95	1.40	0.85
80 - 84	1.95	1.60	1.00
85+	1.95	1.85	1.05

NATIONAL COMPOSITE FACTOR 0.9440

AGED - PART B	INSTI-TUTIONAL	WELFARE	NON-INST'NL NON-WELFARE
MALE			
65 - 69	1.70	1.15	0.80
70 - 74	1.90	1.45	1.00
75 - 79	1.90	1.60	1.10
80 - 84	1.90	1.60	1.10
85+	1.90	1.60	1.10
FEMALE			
65 - 69	1.50	1.05	0.70
70 - 74	1.65	1.15	0.85
75 - 79	1.70	1.25	0.95
80 - 84	1.70	1.25	0.95
85+	1.70	1.25	1.00

NATIONAL COMPOSITE FACTOR 0.9750

## PRODUCT OF (POPULATION \* FACTORS)

AGED - PART A	INSTI-TUTIONAL	WELFARE	NON-INST'NL NON-WELFARE
MALE			
65 - 69	101,768.2	167,440.5	2,518,271.7
70 - 74	133,627.7	241,112.7	2,472,409.8
75 - 79	155,259.8	267,973.9	1,971,744.5
80 - 84	161,226.5	251,948.3	1,128,811.3
85+	234,203.4	185,620.5	774,571.0
FEMALE			
65 - 69	97,117.3	293,234.4	2,521,864.2
70 - 74	180,194.1	417,852.5	2,484,769.0
75 - 79	296,842.6	468,469.4	2,289,640.8
80 - 84	411,223.8	508,953.6	1,788,284.0
85+	720,146.7	764,172.1	1,585,554.6

SUM 2,491,610.1 3,566,777.9 19,535,920.8  
GRAND SUM 25,594,308.8

AGED - PART B	INSTI-TUTIONAL	WELFARE	NON-INST'NL NON-WELFARE
MALE			
65 - 69	91,397.1	173,111.8	2,774,131.2
70 - 74	118,900.1	260,122.8	2,683,000.0
75 - 79	134,599.8	256,968.0	1,928,681.7
80 - 84	138,399.8	186,318.4	1,057,903.0
85+	200,909.8	130,478.4	692,260.8
FEMALE			
65 - 69	96,463.5	419,577.9	2,884,804.3
70 - 74	169,979.7	532,536.3	2,977,954.6
75 - 79	279,813.2	526,961.3	2,533,569.3
80 - 84	383,256.5	419,720.0	1,677,921.3
85+	672,526.8	507,260.0	1,444,636.0

SUM 2,286,246.3 3,413,054.8 20,654,862.2  
GRAND SUM 26,354,163.3

## Appendix C

## NON-HMO POPULATION (HCFA NATIONAL DATA - 1987 AAPCC)

01 - PART A	INSTI-TUTIONAL	WELFARE	NON-INST'NL NON-WELFARE
MALE			
<35	32,615	95,874	154,079
35 - 44	26,983	62,242	212,344
45 - 54	30,914	61,068	313,330
55 - 59	19,730	38,655	314,066
60 - 64	21,369	42,861	498,452

FEMALE			
<35	19,596	65,644	67,731
35 - 44	19,213	44,843	96,722
45 - 54	21,355	57,317	141,727
55 - 59	15,709	54,053	160,846
60 - 64	13,777	75,540	269,380

SUM	221,261	598,097	2,228,677
GRAND SUM			3,048,035

01 - PART B	INSTI-TUTIONAL	WELFARE	NON-INST'NL NON-WELFARE
MALE			
<35	30,015	95,767	134,312
35 - 44	24,269	62,242	184,888
45 - 54	27,881	61,067	276,668
55 - 59	17,912	38,655	282,137
60 - 64	19,603	42,861	454,797

FEMALE			
<35	18,296	65,495	59,006
35 - 44	17,713	44,799	85,780
45 - 54	19,730	57,311	126,451
55 - 59	14,754	54,051	147,584
60 - 64	13,163	75,524	254,387

SUM	203,336	597,772	2,006,010
GRAND SUM			2,807,118

## DEMOGRAPHIC COST FACTORS

01 - PART A	INSTI-TUTIONAL	WELFARE	NON-INST'NL NON-WELFARE
MALE			
<35	1.50	0.95	0.55
35 - 44	1.20	1.00	0.55
45 - 54	1.15	1.35	0.70
55 - 59	0.90	1.55	0.85
60 - 64	0.55	1.70	0.90

FEMALE			
<35	1.65	1.15	0.50
35 - 44	1.50	1.25	0.65
45 - 54	1.40	1.40	0.90
55 - 59	1.00	1.40	1.00
60 - 64	0.60	1.40	1.15

NATIONAL COMPOSITE FACTOR	0.9365		
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01 - PART B	INSTI-TUTIONAL	WELFARE	NON-INST'NL NON-WELFARE
MALE			
<35	1.50	0.95	0.40
35 - 44	1.35	1.00	0.50
45 - 54	1.30	1.25	0.65
55 - 59	1.15	1.35	0.80
60 - 64	0.90	1.40	0.90

FEMALE			
<35	1.75	0.90	0.65
35 - 44	1.75	1.15	0.80
45 - 54	1.75	1.30	1.00
55 - 59	1.40	1.40	1.10
60 - 64	1.10	1.45	1.15

NATIONAL COMPOSITE FACTOR	0.9427		
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## PRODUCT OF (POPULATION \* FACTORS)

01 - PART A	INSTI-TUTIONAL	WELFARE	NON-INST'NL NON-WELFARE
MALE			
<35	48,922.5	91,080.3	84,743.5
35 - 44	32,379.6	62,242.0	116,789.2
45 - 54	35,551.1	82,441.8	219,331.0
55 - 59	17,757.0	59,915.3	266,956.1
60 - 64	11,753.0	72,863.7	448,606.8

FEMALE			
<35	32,333.4	75,490.6	33,865.5
35 - 44	28,819.5	56,053.8	62,869.3
45 - 54	29,897.0	80,243.8	127,554.3
55 - 59	15,709.0	75,674.2	160,846.0
60 - 64	8,266.2	105,756.0	309,787.0

SUM	261,388.3	761,761.4	1,831,348.7
GRAND SUM			2,854,498.3

01 - PART B	INSTI-TUTIONAL	WELFARE	NON-INST'NL NON-WELFARE
MALE			
<35	45,022.5	90,978.7	53,724.8
35 - 44	32,763.2	62,242.0	92,444.0
45 - 54	36,245.3	76,333.8	179,834.2
55 - 59	20,598.8	52,184.3	225,709.6
60 - 64	17,642.7	60,005.4	409,317.3

FEMALE			
<35	32,018.0	58,945.5	38,353.9
35 - 44	30,997.8	51,518.9	68,624.0
45 - 54	34,527.5	74,504.3	126,451.0
55 - 59	20,655.6	75,671.4	162,342.4
60 - 64	14,479.3	109,509.8	292,545.1

SUM	284,950.6	711,893.9	1,649,346.3
GRAND SUM			2,646,190.8

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## Appendix C

## HMO MEMBER MONTHS (HCFA NATIONAL DATA - 1987 AAPCC)

AGEO - PART A	INSTI-TUTIONAL	WELFARE	NON-INST'NL NON-WELFARE
MALE			
65 - 69	0	15,972	1,868,772
70 - 74	0	17,640	1,549,956
75 - 79	0	15,960	983,772
80 - 84	0	13,044	514,236
85+	0	8,712	277,668
FEMALE			
65 - 69	0	40,476	2,190,156
70 - 74	0	45,756	1,800,696
75 - 79	0	40,308	1,231,248
80 - 84	0	35,532	709,284
85+	0	40,488	442,032
SUM	0	273,888	11,567,820
GRAND SUM			11,841,708

AGEO - PART B	INSTI-TUTIONAL	WELFARE	NON-INST'NL NON-WELFARE
MALE			
65 - 69	0	17,424	1,877,040
70 - 74	0	20,100	1,557,048
75 - 79	0	18,684	988,668
80 - 84	0	13,908	516,060
85+	0	8,868	278,040
FEMALE			
65 - 69	0	46,416	2,203,344
70 - 74	0	55,176	1,810,620
75 - 79	0	48,408	1,238,712
80 - 84	0	38,160	712,140
85+	0	40,704	442,644
SUM	0	307,848	11,624,316
GRAND SUM			11,932,164

## NATIONAL COMPOSITE DEMOGRAPHIC FACTORS - SUMMARY

	PART A	PART B
AGEO	0.8361	0.9038
DISABLED	0.9117	0.9052

## DEMOGRAPHIC COST FACTORS

AGEO - PART A	INSTI-TUTIONAL	WELFARE	NON-INST'NL NON-WELFARE
MALE			
65 - 69	2.05	1.35	0.70
70 - 74	2.30	1.70	0.90
75 - 79	2.35	2.05	1.10
80 - 84	2.35	2.25	1.15
85+	2.35	2.25	1.15
FEMALE			
65 - 69	1.65	0.90	0.60
70 - 74	1.90	1.15	0.70
75 - 79	1.95	1.40	0.85
80 - 84	1.95	1.60	1.00
85+	1.95	1.85	1.05
NATIONAL COMPOSITE FACTOR		0.8361	

AGEO - PART B	INSTI-TUTIONAL	WELFARE	NON-INST'NL NON-WELFARE
MALE			
65 - 69	1.70	1.15	0.80
70 - 74	1.90	1.45	1.00
75 - 79	1.90	1.60	1.10
80 - 84	1.90	1.60	1.10
85+	1.90	1.60	1.10
FEMALE			
65 - 69	1.50	1.05	0.70
70 - 74	1.65	1.15	0.85
75 - 79	1.70	1.25	0.95
80 - 84	1.70	1.25	0.95
85+	1.70	1.25	1.00
NATIONAL COMPOSITE FACTOR		0.9038	

## PRODUCT OF (MEMBER MONTHS \* FACTORS)

AGEO - PART A	INSTI-TUTIONAL	WELFARE	NON-INST'NL NON-WELFARE
MALE			
65 - 69	0.0	21,562.2	1,308,140.4
70 - 74	0.0	29,988.0	1,394,960.4
75 - 79	0.0	32,718.0	1,082,149.2
80 - 84	0.0	29,349.0	591,371.4
85+	0.0	19,602.0	319,318.2
FEMALE			
65 - 69	0.0	36,428.4	1,314,093.6
70 - 74	0.0	52,619.4	1,260,487.2
75 - 79	0.0	56,431.2	1,046,560.8
80 - 84	0.0	56,851.2	709,284.0
85+	0.0	74,902.8	464,133.6
SUM	0.0	410,452.2	9,490,498.8
GRAND SUM			9,900,951.0

AGEO - PART B	INSTI-TUTIONAL	WELFARE	NON-INST'NL NON-WELFARE
MALE			
65 - 69	0.0	20,037.6	1,501,632.0
70 - 74	0.0	29,145.0	1,557,048.0
75 - 79	0.0	29,894.4	1,087,534.8
80 - 84	0.0	22,252.8	567,666.0
85+	0.0	14,188.8	305,844.0
FEMALE			
65 - 69	0.0	48,736.8	1,542,340.8
70 - 74	0.0	63,452.4	1,539,027.0
75 - 79	0.0	60,510.0	1,176,776.4
80 - 84	0.0	47,700.0	676,533.0
85+	0.0	50,880.0	442,644.0
SUM	0.0	386,797.8	10,397,046.0
GRAND SUM			10,783,843.8

## Appendix C

## HMO MEMBER MONTHS (HCFA NATIONAL DATA - 1987 AAPCC)

O1 - PART A	INSTI-TUTIONAL	WELFARE	NON-INST'NL NON-WELFARE
MALE			
<35	0	6,492	13,080
35 - 44	0	4,428	23,052
45 - 54	0	4,572	51,216
55 - 59	0	3,408	78,936
60 - 64	0	4,488	122,759
FEMALE			
<35	0	4,248	9,156
35 - 44	0	3,276	14,808
45 - 54	0	4,380	24,624
55 - 59	0	4,716	39,360
60 - 64	0	8,604	65,367
SUM			
GRAND SUM	0	48,612	442,358 490,970

## DEMOGRAPHIC COST FACTORS

O1 - PART A	INSTI-TUTIONAL	WELFARE	NON-INST'NL NON-WELFARE
MALE			
<35	1.50	0.95	0.55
35 - 44	1.20	1.00	0.55
45 - 54	1.15	1.35	0.70
55 - 59	0.90	1.55	0.85
60 - 64	0.55	1.70	0.90
FEMALE			
<35	1.65	1.15	0.50
35 - 44	1.50	1.25	0.65
45 - 54	1.40	1.40	0.90
55 - 59	1.00	1.40	1.00
60 - 64	0.60	1.40	1.15
NATIONAL COMPOSITE FACTOR		0.9117	

## PRODUCT OF (MEMBER MONTHS \* FACTORS)

O1 - PART A	INSTI-TUTIONAL	WELFARE	NON-INST'NL NON-WELFARE
MALE			
<35	0.0	6,167.4	7,194.0
35 - 44	0.0	4,428.0	12,678.6
45 - 54	0.0	6,172.2	35,851.2
55 - 59	0.0	5,282.4	67,095.6
60 - 64	0.0	7,629.6	110,483.1
FEMALE			
<35	0.0	4,885.2	4,578.0
35 - 44	0.0	4,095.0	9,625.2
45 - 54	0.0	6,132.0	22,161.6
55 - 59	0.0	6,602.4	39,360.0
60 - 64	0.0	12,045.6	75,172.0
SUM			
GRAND SUM	0.0	63,439.8	384,199.4 447,639.1

O1 - PART B	INSTI-TUTIONAL	WELFARE	NON-INST'NL NON-WELFARE
MALE			
<35	0	6,492	13,056
35 - 44	0	4,428	22,992
45 - 54	0	4,572	51,108
55 - 59	0	3,408	78,828
60 - 64	0	4,488	123,551
FEMALE			
<35	0	4,248	9,132
35 - 44	0	3,276	14,796
45 - 54	0	4,380	24,612
55 - 59	0	4,716	39,324
60 - 64	0	8,604	66,319
SUM			
GRAND SUM	0	48,612	443,718 492,330

O1 - PART B	INSTI-TUTIONAL	WELFARE	NON-INST'NL NON-WELFARE
MALE			
<35	1.50	0.95	0.40
35 - 44	1.35	1.00	0.50
45 - 54	1.30	1.25	0.65
55 - 59	1.15	1.35	0.80
60 - 64	0.90	1.40	0.90
FEMALE			
<35	1.75	0.90	0.65
35 - 44	1.75	1.15	0.80
45 - 54	1.75	1.30	1.00
55 - 59	1.40	1.40	1.10
60 - 64	1.10	1.45	1.15
NATIONAL COMPOSITE FACTOR		0.9052	

O1 - PART B	INSTI-TUTIONAL	WELFARE	NON-INST'NL NON-WELFARE
MALE			
<35	0.0	6,167.4	5,222.4
35 - 44	0.0	4,428.0	11,496.0
45 - 54	0.0	5,715.0	33,220.2
55 - 59	0.0	4,600.8	63,062.4
60 - 64	0.0	6,283.2	111,195.9
FEMALE			
<35	0.0	3,823.2	5,935.8
35 - 44	0.0	3,767.4	11,836.8
45 - 54	0.0	5,694.0	24,612.0
55 - 59	0.0	6,602.4	43,256.4
60 - 64	0.0	12,475.8	76,266.8
SUM			
GRAND SUM	0.0	59,557.2	386,104.8 445,662.0

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Appendix D  
Development of Implied HMO Costs PMPM  
for Counties with Over 6,000 HMO Member Months in 1984

In order to test the validity of the non-HMO cost development in the AAPCC calculation process, we derived HMO per capita costs for aged enrollees in each county which experienced over 6,000 aged HMO member months (500 average HMO enrollees) in 1984. These are generally cost based HMOs. The formula used to derive the HMO per capita costs is (all symbols apply to aged enrollees only):

$$\text{CHPCC} = \frac{\text{CPCC} \times E_{\text{tot}} - \text{CNHPCC} \times E_{\text{non-HMO}}}{E_{\text{tot}} - E_{\text{non-HMO}}}$$

where:

CHPCC = the per capita cost for all HMO Medicare enrollees in the county.<sup>1/</sup>

CPCC = the per capita cost for all Medicare enrollees in the county.

CNHPCC = the per capita cost for all non-HMO Medicare enrollees in the county.

$E_{\text{tot}}$  = Medicare enrollment in the county as of July 1, 1984

$E_{\text{HMO}}$  = Average HMO enrollment in the county in 1984.

$E_{\text{non-HMO}} = E_{\text{tot}} - E_{\text{HMO}}$

Calculations were performed separately for Part A and Part B.

A good measure of the validity of the calculation, in any county, is the ratio of HMO per capita costs to non-HMO per-capita costs, or (CHPCC + CNHPCC). When this ratio is 1.00, it is virtually certain that no adjustment has been made to the county data for the HMO enrollees unless they have identical cost characteristics. When the ratio is not 1.00, an adjustment has been made, and we would like to test its accuracy.

<sup>1/</sup> HCFA's source for payments made to HMOs for Medicare beneficiaries is derived from records of the Office of Prepaid Health Care on payments made to both risk and cost based HMOs.

Ratios below 1.00 indicate that HMO costs in a county are less than non-HMO costs on a fee-for-service basis. This may be due to (1) HMO-effected reductions in cost which would otherwise have occurred, or (2) favorable HMO selection. Ratios above 1.00 indicate that HMO costs in a county are greater than non-HMO costs on a fee-for-service basis. This may be due to increases in cost which result from the HMOs' emphasis on comprehensive care and wellness, or due to unfavorable HMO selection.

Some preliminary observations can be made from the tables in this appendix. Some of the ratios which now appear unusual may be quite reasonable upon further research. Our purpose here is to point out some "apparently" anomalous results which should be investigated by HCFA to determine if problems or biases exist in the methods used for these allocations.

1. Numerous counties have ratios for Part A which are below 70%. Some are below 35% (e.g., Honolulu, Hawaii and Dubuque, Iowa).
2. Minnesota counties exhibit an odd pattern for Part A ratios. That is, St. Louis county is over 100%; Wright, Ramsey, and Washington counties are roughly 80%; and Scott and Sherburne counties are below 45%. Part B ratios for these counties are somewhat more consistent.
3. A number of counties have Part B ratios below 50%, including 4 counties in West Virginia.
4. Two counties have Part B ratios above 150%, both in Ohio.

We recommend that HCFA investigate these results in order to determine if they represent true cost patterns, or if they result from problems in the methodology used to allocate HMO costs by county. Another question which should be addressed is as follows: If true HMO costs in an area are substantially different from non-HMO costs, is the non-HMO per capita cost developed in the current AAPCC a good estimate of what Medicare enrollees would have cost had they not been members of the HMO?

In working with many HMOs with Medicare business, we have come to suspect that the occurrence of low Part B costs of HMO members relative to non-HMO costs is more an indication of incomplete reporting of the costs associated with HMO members than it is an indication of lower utilization and cost per service.



## Appendix D

## Development of Implied HMO Costs PMPM for Counties with Over 6,000 HMO Member Months in 1984

## PART A

#	County	State	HMO Member Months	Non-HMO Enrollment	Total Enrollment	HMO Penetration	CPCC	CNHPPC	CHPCC	Ratio to CHPCC
1	Jefferson	Alabama	37,776	80,429	83,577	3.77%	\$137.77	\$137.77	\$137.77	100.00%
2	Walker	Alabama	19,824	7,623	9,275	17.81%	159.13	159.13	159.13	100.00%
3	Maricopa	Arizona	12,732	196,663	197,724	0.54%	118.15	118.15	118.15	100.00%
4	Alameda	California	256,620	92,834	114,219	18.72%	158.35	161.86	143.11	88.42%
5	Butte	California	10,764	24,643	25,540	3.51%	125.09	125.09	125.09	100.00%
6	Contra Costa	California	201,300	50,696	67,471	24.86%	147.16	147.16	147.16	100.00%
7	El Dorado	California	14,760	9,293	10,523	11.69%	108.74	107.16	120.68	112.62%
8	Kern	California	8,592	41,787	42,503	1.68%	139.25	139.25	139.25	100.00%
9	Lake	California	10,248	8,923	9,777	8.73%	134.61	134.61	134.61	100.00%
10	Los Angeles	California	1,206,084	625,620	726,127	13.84%	182.79	166.45	160.00	85.81%
11	Marin	California	45,516	18,978	22,771	16.66%	137.28	139.81	124.62	89.14%
12	Napa	California	36,108	11,372	14,381	20.92%	152.35	152.35	152.35	100.00%
13	Nevada	California	7,464	8,519	9,141	6.80%	97.64	96.66	111.07	114.91%
14	Orange	California	200,016	158,328	174,996	9.52%	159.25	162.47	128.65	79.18%
15	Placer	California	34,824	13,067	15,989	18.15%	115.80	114.59	121.26	105.82%
16	Riverside	California	106,944	100,416	109,328	8.15%	135.63	139.67	90.10	64.51%
17	Sacramento	California	222,336	65,621	84,149	22.02%	133.72	133.66	133.93	100.20%
18	San Bernardino	California	145,092	83,836	95,927	12.60%	138.29	145.63	87.38	60.00%
19	San Diego	California	261,840	186,833	208,653	10.46%	124.88	129.58	84.65	65.33%
20	San Francisco	California	201,828	77,017	93,836	17.92%	187.39	187.39	187.39	100.00%
21	San Joaquin	California	38,880	39,178	42,418	7.64%	127.44	127.19	130.46	102.57%
22	San Mateo	California	151,740	50,444	63,089	20.04%	150.10	156.26	125.52	80.33%
23	Santa Clara	California	155,196	87,503	100,436	12.86%	133.95	133.95	133.95	100.00%
24	Santa Cruz	California	11,544	23,494	24,456	3.93%	108.88	108.88	108.88	100.00%
25	Solano	California	61,140	14,236	19,331	26.36%	132.14	132.14	132.14	100.00%
26	Sonoma	California	49,728	38,213	42,357	9.78%	124.99	124.99	124.99	100.00%
27	Ventura	California	24,768	46,958	49,017	4.21%	136.72	137.87	110.55	80.18%
28	Yolo	California	17,280	9,316	10,756	13.39%	124.50	123.41	131.55	106.60%
29	Adams	Colorado	21,876	17,846	19,669	9.27%	138.81	138.81	138.81	100.00%
30	Arapahoe	Colorado	8,796	13,757	14,490	5.06%	130.50	130.50	130.50	100.00%
31	Boulder	Colorado	6,624	14,028	14,580	3.79%	105.60	105.60	105.60	100.00%
32	Denver	Colorado	50,532	60,496	64,707	6.51%	153.00	153.00	153.00	100.00%
33	Jefferson	Colorado	14,868	18,613	19,852	6.24%	132.80	132.80	132.80	100.00%
34	Mesa	Colorado	43,644	5,981	9,618	37.81%	106.28	113.35	94.65	83.50%
35	Fairfield	Connecticut	18,312	96,026	97,552	1.56%	140.95	141.40	112.55	79.60%
36	Hartford	Connecticut	10,500	103,861	104,736	0.84%	141.30	141.72	91.72	64.72%
37	New Haven	Connecticut	42,264	101,214	104,736	3.36%	134.41	135.37	106.80	78.89%
38	Broward	Florida	406,500	184,158	218,033	15.54%	151.50	151.50	152.32	100.64%
39	Dade	Florida	354,936	179,521	209,099	14.15%	191.13	192.04	185.61	96.65%
40	Hillsborough	Florida	135,492	66,923	78,214	14.44%	121.61	121.61	121.61	100.00%
41	Orange	Florida	6,264	57,213	57,735	0.90%	133.89	133.89	133.89	100.00%
42	Palm Beach	Florida	336,300	124,179	152,204	18.41%	112.46	111.37	117.29	105.32%
43	Pasco	Florida	125,820	53,584	64,069	16.37%	107.90	107.76	108.62	100.80%
44	Pinellas	Florida	292,512	171,822	196,198	12.42%	124.53	125.21	119.73	95.62%
45	Volusia	Florida	37,344	59,495	62,607	4.97%	112.98	113.42	104.57	92.20%

## Appendix D

## Development of Implied HMO Costs PMPM for Counties with Over 6,000 HMO Member Months in 1984

## PART A

#	County	State	HMO Member Months	Non-HMO Enrollment	Total Enrollment	HMO Penetration	CPCC	CNHPCC	CHPCC	Ratio CHPCC to CNHPCC
46	DeKalb	Georgia	6,096	38,282	38,790	1.31%	\$117.66	\$117.68	\$116.15	98.70%
47	Hawaii	Hawaii	13,128	10,241	11,335	9.65%	76.31	76.31	76.31	100.00%
48	Honolulu	Hawaii	96,144	54,701	82,713	12.78%	121.45	132.93	43.10	32.42%
49	Mau	Hawaii	31,296	5,464	8,072	32.31%	96.78	96.78	96.78	100.00%
50	Christian	Illinois	7,092	5,225	5,816	10.16%	151.93	151.93	151.93	100.00%
51	Cook	Illinois	218,064	550,814	568,986	3.19%	187.86	188.74	161.15	85.38%
52	DuPage	Illinois	14,316	54,963	56,156	2.12%	151.29	151.44	144.36	95.32%
53	Franklin	Illinois	21,360	6,077	5,857	22.65%	111.38	111.38	111.38	100.00%
54	Macon	Illinois	9,420	14,794	15,579	5.04%	116.71	116.71	116.71	100.00%
55	Rock Island	Illinois	19,140	18,831	20,426	7.81%	134.99	134.99	134.99	100.00%
56	Williamson	Illinois	14,892	7,302	8,543	14.53%	112.87	112.87	112.87	100.00%
57	Winnebago	Illinois	17,616	26,016	27,484	5.34%	114.20	114.21	114.02	99.83%
58	Marion	Indiana	42,384	80,959	84,491	4.18%	141.48	142.20	124.98	87.89%
59	Black Hawk	Iowa	14,412	14,039	15,240	7.88%	122.20	121.90	125.71	103.13%
60	Dubuque	Iowa	23,076	9,196	11,119	17.29%	136.28	156.71	38.55	24.60%
61	Shawnee	Kansas	20,916	17,091	18,834	9.25%	129.67	129.67	129.67	100.00%
62	Bell	Kentucky	8,976	3,165	3,913	19.12%	112.96	112.96	112.96	100.00%
63	Floyd	Kentucky	17,364	2,974	4,421	32.73%	131.75	131.75	131.75	100.00%
64	Harlan	Kentucky	17,988	3,042	4,541	33.01%	96.87	96.87	96.87	100.00%
65	Hopkins	Kentucky	12,012	5,300	6,301	15.89%	132.25	132.25	132.25	100.00%
66	Jefferson	Kentucky	10,656	78,447	79,335	1.12%	127.05	127.58	80.26	62.91%
67	Letcher	Kentucky	11,136	2,078	3,006	30.87%	112.34	112.34	112.34	100.00%
68	Muhlenburg	Kentucky	9,900	3,584	4,409	18.71%	113.78	113.78	113.78	100.00%
69	Perry	Kentucky	10,068	2,367	3,206	26.17%	121.31	121.31	121.31	100.00%
70	Pike	Kentucky	24,060	4,358	6,363	31.51%	113.92	113.92	113.92	100.00%
71	Montgomery	Maryland	22,272	52,477	54,333	3.42%	130.09	130.70	112.86	86.35%
72	Prince Georges	Maryland	10,320	35,231	36,091	2.38%	192.34	193.26	154.60	80.00%
73	Hampden	Massachusetts	32,604	57,992	60,709	4.48%	126.61	127.11	115.95	91.22%
74	Norfolk	Massachusetts	30,564	73,985	76,532	3.33%	173.51	174.10	156.38	89.82%
75	Plymouth	Massachusetts	15,276	42,375	43,648	2.92%	152.31	152.80	136.02	89.02%
76	Worcester	Massachusetts	128,760	76,580	87,310	12.29%	168.79	171.35	150.52	87.84%
77	Genesee	Michigan	37,704	35,604	38,746	8.11%	178.22	178.31	177.20	99.38%
78	Ingham	Michigan	14,844	23,146	24,383	5.07%	140.91	143.44	93.54	65.21%
79	Oakland	Michigan	9,588	99,901	100,700	0.79%	162.13	162.11	164.64	101.56%
80	Wayne	Michigan	25,560	241,603	243,733	0.87%	181.29	181.27	183.57	101.27%
81	Anoka	Minnesota	26,016	4,511	6,679	32.46%	143.00	162.95	101.49	62.28%
82	Carver	Minnesota	12,456	3,221	3,221	32.23%	128.16	128.16	59.44	36.96%
83	Chisago	Minnesota	8,424	2,719	3,421	20.52%	131.86	131.86	131.86	100.00%
84	Dakota	Minnesota	29,736	8,819	11,297	21.94%	142.01	146.37	126.50	86.42%
85	Hennepin	Minnesota	399,456	76,806	110,094	30.24%	158.96	178.14	114.71	64.39%
86	Isanti	Minnesota	6,336	1,890	2,418	21.84%	145.56	145.56	145.56	100.00%
87	Lake	Minnesota	9,276	824	1,597	48.40%	87.49	87.49	87.49	100.00%
88	Meeker	Minnesota	6,912	2,648	3,224	17.87%	108.06	108.06	108.06	100.00%
89	Miller	Minnesota	7,560	2,762	3,392	18.57%	128.98	128.98	128.98	100.00%
90	Ramsey	Minnesota	173,148	42,712	57,141	25.25%	162.24	170.43	137.99	80.97%

## Appendix D

## Development of Implied HMO Costs PMPM for Counties with Over 6,000 HMO Member Months in 1984

## PART A

#	County	State	HMO Member Months	Non-HMO Enrollment	Total Enrollment	HMO Penetration	CPCC	CNHPPC	CHPCC	Ratio CHPCC to CNHPPC
91	Scott	Minnesota	9,264	2,262	3,034	25.44%	\$135.46	\$157.86	\$69.81	44.22%
92	Sherburne	Minnesota	6,828	1,845	2,414	23.57%	120.57	139.38	59.58	42.75%
93	Stearns	Minnesota	20,028	10,006	11,675	14.30%	115.93	115.93	115.93	100.00%
94	St Louis	Minnesota	48,876	27,878	31,951	12.75%	119.82	119.64	121.05	101.18%
95	Washington	Minnesota	18,192	5,125	6,641	22.83%	138.90	143.26	124.16	86.67%
96	Wright	Minnesota	25,308	4,109	6,218	33.92%	125.62	137.05	103.35	75.41%
97	St Louis	Missouri	41,352	109,504	112,950	3.05%	146.83	147.38	129.35	87.77%
98	St Louis City	Missouri	30,552	69,722	72,268	3.52%	160.82	161.69	136.97	84.71%
99	Clark	Nevada	28,464	44,176	46,548	5.10%	159.49	159.49	159.49	100.00%
100	Bergen	New Jersey	17,988	110,975	112,474	1.33%	119.91	119.91	119.91	100.00%
101	Burlington	New Jersey	6,396	31,512	32,045	1.66%	132.75	133.34	97.80	73.35%
102	Essex	New Jersey	8,028	92,699	93,368	0.72%	166.32	166.42	152.53	91.65%
103	Hudson	New Jersey	21,000	63,409	65,159	2.69%	158.09	158.09	158.09	100.00%
104	Middlesex	New Jersey	37,572	58,241	61,372	5.10%	146.29	147.19	129.54	88.01%
105	Monmouth	New Jersey	8,376	62,036	62,734	1.11%	128.25	128.68	89.94	69.89%
106	Ocean	New Jersey	10,812	83,091	83,992	1.07%	98.79	98.79	98.79	100.00%
107	Union	New Jersey	7,776	67,366	68,014	0.95%	144.54	144.50	148.71	102.91%
108	Bernalillo	New Mexico	9,960	37,647	38,477	2.15%	114.11	114.11	114.11	100.00%
109	Curry	New Mexico	6,072	3,691	4,197	12.06%	101.58	101.58	101.58	100.00%
110	Bronx	New York	178,944	117,839	132,751	11.23%	239.93	239.93	239.93	100.00%
111	Erie	New York	15,024	131,485	132,737	0.94%	125.81	126.43	60.47	47.83%
112	Kings	New York	332,208	234,686	262,370	10.55%	202.89	202.89	202.89	100.00%
113	Monroe	New York	49,404	76,940	81,057	5.08%	134.72	134.76	133.97	99.41%
114	Nassau	New York	92,592	152,616	160,332	4.81%	154.98	154.98	154.98	100.00%
115	New York	New York	187,248	168,029	183,633	8.50%	215.95	215.95	215.95	100.00%
116	Queens	New York	307,020	222,134	247,719	10.33%	173.59	173.59	173.59	100.00%
117	Richmond	New York	61,956	31,634	36,797	14.03%	207.97	207.97	207.97	100.00%
118	Suffolk	New York	58,956	119,650	124,563	3.94%	131.90	131.90	131.90	100.00%
119	Westchester	New York	63,360	109,463	114,743	4.60%	160.74	164.60	80.69	49.02%
120	Belmont	Ohio	38,628	8,875	12,094	26.62%	145.35	160.30	104.14	64.97%
121	Clermont	Ohio	6,648	8,681	9,235	6.00%	136.17	136.66	128.49	94.02%
122	Cuyahoga	Ohio	111,912	191,932	201,258	4.63%	152.95	152.95	152.95	100.00%
123	Franklin	Ohio	7,944	79,590	80,252	0.82%	110.26	110.26	110.26	100.00%
124	Hamilton	Ohio	59,952	101,560	106,556	4.69%	142.56	143.22	129.15	90.18%
125	Jefferson	Ohio	10,380	11,866	12,731	6.79%	173.87	177.65	121.98	68.66%
126	Lake	Ohio	7,464	20,132	20,754	3.00%	128.80	128.80	128.80	100.00%
127	Marion	Ohio	27,732	4,981	7,292	31.69%	105.17	119.91	73.40	61.21%
128	Clackamas	Oregon	94,812	14,837	22,738	34.75%	143.84	143.84	143.84	100.00%
129	Lane	Oregon	15,492	29,408	30,699	4.21%	104.55	104.31	110.01	105.46%
130	Marion	Oregon	22,188	28,549	30,398	6.08%	119.88	119.88	119.88	100.00%
131	Multnomah	Oregon	174,132	66,547	81,058	17.90%	182.51	184.96	171.27	92.60%
132	Washington	Oregon	25,608	17,669	19,803	10.78%	164.72	164.72	164.72	100.00%
133	Alligheny	Pennsylvania	42,816	204,265	207,833	1.72%	168.38	169.66	95.24	56.14%
134	Armstrong	Pennsylvania	11,820	11,224	12,209	8.07%	120.87	125.45	68.70	54.76%
135	Bucks	Pennsylvania	7,296	43,654	44,262	1.37%	139.36	139.87	102.64	73.38%

## Development of Implied HMO Costs PMPH for Counties with Over 6,000 HMO Member Months in 1984

## PART A

#	County	State	HMO Member Months	Non-HMO Enrollment	Total Enrollment	HMO Penetration	CPCC	CNHPPC	CHPCC	Ratio CHPCC to CNHPPC
136	Cambria	Pennsylvania	53,928	22,976	27,470	16.36%	\$154.93	\$154.93	\$154.93	100.00%
137	Clearfield	Pennsylvania	10,728	10,453	11,347	7.88%	125.89	125.89	125.89	100.00%
138	Delaware	Pennsylvania	7,092	71,975	72,566	0.81%	148.42	148.94	84.74	56.90%
139	Fayette	Pennsylvania	56,592	19,172	23,888	19.74%	143.34	143.34	143.34	100.00%
140	Greene	Pennsylvania	15,000	4,587	5,637	21.42%	132.46	132.46	132.46	100.00%
141	Indiana	Pennsylvania	24,372	9,167	11,198	18.14%	130.67	143.41	73.18	51.03%
142	Montgomery	Pennsylvania	14,628	84,231	85,450	1.43%	138.40	138.86	106.69	76.83%
143	Philadelphia	Pennsylvania	45,528	231,495	235,289	1.61%	188.74	190.00	111.74	58.81%
144	Somerset	Pennsylvania	23,256	9,433	11,371	17.04%	123.59	123.59	123.59	100.00%
145	Washington	Pennsylvania	40,788	28,069	31,468	10.80%	153.87	153.87	153.87	100.00%
146	Westmoreland	Pennsylvania	42,840	48,836	52,406	6.81%	142.71	147.17	81.68	55.50%
147	Providence	Rhode Island	22,332	83,032	84,893	2.19%	137.98	139.24	81.71	58.68%
148	Campbell	Tennessee	9,360	3,705	4,485	17.39%	109.36	109.36	109.36	100.00%
149	Carbon	Utah	8,556	1,826	2,339	30.48%	119.54	119.54	119.54	100.00%
150	Salt Lake	Utah	13,296	50,183	51,291	2.16%	94.54	94.54	94.54	100.00%
151	Arlington	Virginia	5,244	15,716	16,153	2.71%	136.81	137.56	109.88	79.88%
152	Buchanan	Virginia	7,752	1,576	2,222	29.07%	148.60	148.60	148.60	100.00%
153	Dickenson	Virginia	6,444	1,192	1,729	31.06%	119.69	119.69	119.69	100.00%
154	Lee	Virginia	8,592	2,804	3,520	20.34%	94.39	94.39	94.39	100.00%
155	Tazewell	Virginia	17,376	4,309	5,757	25.15%	124.69	124.69	124.69	100.00%
156	Wise	Virginia	14,868	3,710	4,949	25.04%	118.78	118.78	118.78	100.00%
157	District of Columbia		22,404	64,360	66,227	2.82%	192.97	192.97	148.89	77.16%
158	Clark	Washington	48,228	15,621	19,640	117.78	114.03	132.36	116.07%	100.00%
159	King	Washington	275,376	118,386	141,334	16.24%	135.50	140.22	111.16	79.28%
160	Pierce	Washington	16,068	47,399	48,738	2.75%	111.30	111.65	98.92	88.60%
161	Snohomish	Washington	33,960	29,507	32,337	8.75%	129.18	131.01	110.10	84.04%
162	Spokane	Washington	25,800	40,252	42,402	5.07%	123.22	122.78	112.73	91.07%
163	Thurston	Washington	15,888	12,971	14,295	9.26%	107.13	108.38	94.88	87.54%
164	Boone	West Virginia	12,564	1,821	2,868	36.51%	133.03	136.74	126.58	92.57%
165	Fayette	West Virginia	34,704	4,939	7,831	36.93%	119.34	134.20	93.96	70.01%
166	Greenbrier	West Virginia	7,572	4,648	5,279	11.95%	110.30	110.30	110.30	100.00%
167	Harrison	West Virginia	12,864	10,622	11,694	9.17%	122.54	122.54	122.54	100.00%
168	Kanawha	West Virginia	21,996	27,639	29,472	6.22%	129.62	129.62	129.62	100.00%
169	Logan	West Virginia	23,652	3,023	4,994	39.47%	134.96	134.96	134.96	100.00%
170	McDowell	West Virginia	27,336	2,932	5,210	43.72%	128.11	128.11	128.11	100.00%
171	Marion	West Virginia	23,064	8,019	9,941	19.33%	107.05	107.05	107.05	100.00%
172	Mercer	West Virginia	22,056	7,691	9,529	19.29%	121.83	121.83	121.83	100.00%
173	Mingo	West Virginia	14,268	2,247	3,436	34.60%	140.66	140.66	140.66	100.00%
174	Monongalia	West Virginia	13,608	5,764	6,898	16.44%	117.83	117.83	117.83	100.00%
175	Nicholas	West Virginia	7,164	2,574	3,171	18.83%	104.20	104.20	104.20	100.00%
176	Ohio	West Virginia	14,796	8,271	9,504	12.97%	151.89	155.23	129.48	83.41%
177	Raleigh	West Virginia	56,088	5,602	10,276	45.48%	98.81	115.18	79.19	68.75%
178	Wyoming	West Virginia	12,192	1,680	2,696	37.69%	131.06	150.34	99.19	65.98%
Total			10,726,452	9,632,405	10,526,276	8.49%	\$153.56	\$154.86	\$139.51	90.09%

## Development of Implied HMO Costs PMPM for Counties with Over 6,000 HMO Member Months in 1984

## PART 8

#	County	State	HMO Member Months	Non-HMO	Total	HMO	CPCC	CNHPPC	CHPCC	Ratio CHPCC to CNHPPC
				Enrollment	Enrollment	Penetration				
1	Jefferson	Alabama	37,788	80,079	83,228	3.78%	\$67.54	\$67.54	\$67.54	100.00%
2	Walker	Alabama	19,824	7,728	9,380	17.61%	74.82	74.82	74.82	100.00%
3	Maricopa	Arizona	12,768	194,464	195,548	0.54%	86.07	86.07	86.07	100.00%
4	Alameda	California	260,088	93,057	114,731	18.89%	102.70	107.53	81.96	76.22%
5	Butte	California	10,836	24,553	25,456	3.55%	86.27	86.27	86.27	100.00%
6	Contra Costa	California	203,220	50,537	67,472	25.10%	107.08	115.76	81.18	70.13%
7	El Dorado	California	14,844	9,161	10,396	11.90%	79.14	80.48	69.22	86.01%
8	Kern	California	8,640	41,931	42,651	1.69%	100.52	100.52	100.52	100.00%
9	Lake	California	10,296	8,843	9,701	8.84%	95.12	99.49	50.06	50.32%
10	Los Angeles	California	1,228,752	637,741	740,137	13.83%	134.08	140.35	95.01	67.70%
11	Marin	California	46,200	18,655	22,505	17.11%	97.19	102.03	73.74	72.27%
12	Mapa	California	36,900	11,220	14,295	21.51%	105.95	113.21	79.46	70.19%
13	Nevada	California	7,536	8,413	9,041	6.95%	73.27	73.27	73.27	100.00%
14	Orange	California	202,044	158,767	175,604	9.59%	128.19	131.83	93.87	71.21%
15	Placer	California	35,112	12,989	15,915	18.39%	87.24	87.01	88.26	101.44%
16	Riverside	California	107,820	99,735	108,720	8.26%	103.96	106.61	74.53	69.91%
17	Sacramento	California	223,644	64,898	83,535	22.31%	94.66	97.37	85.22	87.52%
18	San Bernardino	California	146,328	83,380	95,574	12.76%	97.82	103.02	62.27	60.44%
19	San Diego	California	263,736	185,773	207,751	10.58%	110.38	113.99	79.87	70.07%
20	San Francisco	California	204,216	79,111	96,129	17.70%	106.51	108.59	96.84	89.18%
21	San Joaquin	California	38,952	39,328	42,574	7.62%	94.30	91.67	126.18	137.65%
22	San Mateo	California	152,676	50,782	63,505	20.03%	95.09	97.76	84.43	86.36%
23	Santa Clara	California	156,480	88,482	101,522	12.84%	91.97	94.74	73.17	77.23%
24	Santa Cruz	California	11,616	23,364	24,332	3.98%	83.04	83.04	83.04	100.00%
25	Solano	California	63,300	13,840	19,115	27.60%	93.41	105.36	62.06	58.90%
26	Sonoma	California	50,280	37,971	42,161	9.94%	87.59	89.37	71.46	79.96%
27	Ventura	California	25,164	46,949	49,046	4.28%	107.47	108.88	75.94	69.75%
28	Yolo	California	17,412	9,296	10,747	13.50%	87.16	87.49	85.05	97.21%
29	Adams	Colorado	22,032	17,509	19,345	9.49%	77.28	77.69	73.37	94.44%
30	Arapahoe	Colorado	8,892	13,547	14,288	5.19%	74.84	74.72	77.03	103.09%
31	Boulder	Colorado	6,672	13,942	14,498	3.84%	59.03	58.93	61.53	104.41%
32	Denver	Colorado	51,012	59,830	64,081	6.63%	80.26	80.26	80.26	100.00%
33	Jefferson	Colorado	15,012	18,334	19,585	6.39%	75.47	75.47	75.47	100.00%
34	Hess	Colorado	44,124	5,819	9,496	38.72%	73.65	57.97	98.47	169.86%
35	Fairfield	Connecticut	18,312	95,711	97,237	1.57%	76.81	76.81	76.81	100.00%
36	Hartford	Connecticut	10,500	104,092	104,967	0.83%	74.54	74.54	74.54	100.00%
37	New Haven	Connecticut	42,204	100,831	104,348	3.37%	71.68	71.68	71.68	100.00%
38	Broward	Florida	403,688	183,623	217,597	15.61%	120.93	118.44	134.39	113.47%
39	Oade	Florida	371,640	195,246	226,216	13.69%	151.13	148.24	169.35	114.24%
40	Hillsborough	Florida	136,668	66,739	78,128	14.58%	84.11	84.11	84.11	100.00%
41	Orange	Florida	6,300	56,851	57,376	0.92%	79.44	79.55	67.59	84.97%
42	Palm Beach	Florida	337,476	123,591	151,714	18.54%	97.33	95.41	105.77	110.86%
43	Pasco	Florida	125,904	53,112	63,604	16.50%	71.27	69.69	79.27	113.75%
44	Pinellas	Florida	293,088	170,123	194,547	12.55%	77.06	76.11	83.68	109.95%
45	Volusia	Florida	37,380	58,819	61,934	5.03%	69.95	68.63	94.87	138.23%

## Development of Implied HMO Costs PMPM for Counties with Over 6,000 HMO Member Months in 1984

## PART 8

#	County	State	HMO Member Months	Non-HMO Enrollment	Total Enrollment	HMO Penetration	CPCC	CNHPPC	CHPCC	Ratio CHPCC to CNHPPC
46	DeKalb	Georgia	6,096	38,166	38,674	1.31%	\$67.61	\$67.61	\$67.61	100.00%
47	Hawaii	Hawaii	13,188	10,174	11,273	9.75%	63.93	67.17	33.94	50.53%
48	Honolulu	Hawaii	96,912	54,319	62,395	12.94%	83.55	86.37	65.35	75.66%
49	Kauai	Hawaii	31,392	5,468	8,084	32.36%	76.22	90.56	46.25	51.07%
50	Christian	Illinois	7,092	5,230	5,821	10.15%	72.08	75.94	37.91	49.92%
51	Cook	Illinois	218,364	548,845	567,042	3.21%	78.92	78.92	78.92	100.00%
52	DuPage	Illinois	14,316	54,783	55,976	2.13%	71.42	71.42	71.42	100.00%
53	Franklin	Illinois	21,360	6,096	7,776	22.60%	58.41	58.41	58.41	100.00%
54	Macon	Illinois	9,420	14,709	15,494	5.07%	52.02	52.95	34.61	65.36%
55	Rock Island	Illinois	19,296	18,748	20,356	7.90%	54.49	55.75	39.80	71.39%
56	Williamson	Illinois	14,892	7,275	8,516	14.57%	61.30	66.86	28.70	42.93%
57	Winnebago	Illinois	17,616	25,883	27,351	5.37%	57.72	57.72	57.72	100.00%
58	Marion	Indiana	42,372	79,488	83,019	4.25%	65.14	65.39	59.51	91.01%
59	Black Hawk	Iowa	14,436	14,005	15,208	7.91%	52.69	52.69	52.69	100.00%
60	Dubuque	Iowa	23,100	9,197	11,122	17.31%	53.55	53.55	53.55	100.00%
61	Shawnee	Kansas	20,916	16,701	18,444	9.45%	69.71	73.26	35.69	48.72%
62	Bell	Kentucky	8,976	3,268	4,016	18.63%	59.51	59.51	59.51	100.00%
63	Floyd	Kentucky	17,364	3,075	4,522	32.00%	72.09	72.09	72.09	100.00%
64	Harlan	Kentucky	18,012	3,076	4,577	32.79%	60.45	60.45	60.45	100.00%
65	Hopkins	Kentucky	12,012	5,336	6,337	15.80%	63.85	63.85	63.85	100.00%
66	Jefferson	Kentucky	10,680	78,070	78,960	1.13%	54.59	54.59	54.59	100.00%
67	Letcher	Kentucky	11,136	2,147	3,075	30.18%	73.10	73.10	73.10	100.00%
68	Muhlenburg	Kentucky	9,900	3,607	4,432	18.61%	36.54	39.08	25.43	65.07%
69	Perry	Kentucky	10,068	2,443	3,282	25.56%	68.15	68.15	68.15	100.00%
70	Pike	Kentucky	24,072	4,453	6,459	31.06%	62.92	62.92	62.92	100.00%
71	Montgomery	Maryland	24,816	52,878	54,946	3.76%	98.74	98.74	98.74	100.00%
72	Prince Georges	Maryland	11,184	34,845	35,777	2.61%	113.58	113.58	113.58	100.00%
73	Hampden	Massachusetts	32,580	57,584	60,299	4.50%	73.40	73.76	65.76	89.15%
74	Norfolk	Massachusetts	30,564	72,959	75,506	3.37%	91.52	91.83	82.63	89.98%
75	Plymouth	Massachusetts	15,264	41,522	42,794	2.97%	78.67	79.08	72.01	91.06%
76	Worcester	Massachusetts	128,760	76,429	87,159	12.31%	80.34	80.91	76.28	94.28%
77	Genesee	Michigan	37,704	35,700	38,842	8.09%	109.74	110.06	99.92	90.79%
78	Ingham	Michigan	14,808	23,076	24,310	5.08%	69.70	69.82	67.46	96.62%
79	Oakland	Michigan	9,588	98,772	100,571	0.79%	116.87	116.90	113.10	96.75%
80	Wayne	Michigan	25,572	241,102	243,233	0.88%	113.86	113.68	134.13	117.99%
81	Anoka	Minnesota	26,016	4,415	6,583	32.93%	65.16	69.04	57.26	82.94%
82	Carver	Minnesota	12,456	2,183	3,221	32.23%	54.16	52.79	57.04	108.05%
83	Chisago	Minnesota	6,424	2,691	3,393	20.60%	46.09	46.55	44.33	95.23%
84	Dakota	Minnesota	29,336	8,685	11,163	22.20%	63.14	62.44	65.59	105.04%
85	Hennepin	Minnesota	399,480	75,720	109,010	30.54%	70.44	71.74	67.48	94.06%
86	Isanti	Minnesota	6,348	1,874	2,403	22.01%	47.27	47.00	48.23	102.62%
87	Lake	Minnesota	9,360	825	1,605	48.60%	48.66	45.62	52.29	114.62%
88	Meeker	Minnesota	6,912	2,639	3,215	17.92%	43.04	43.04	43.04	100.00%
89	Willie Lacs	Minnesota	7,560	2,743	3,373	18.68%	51.82	50.39	58.05	115.20%
90	Ramsey	Minnesota	173,256	42,327	56,765	25.43%	69.01	69.23	68.36	98.74%

## Appendix D

## Development of Implied HMO Costs PMPM for Counties with Over 6,000 HMO Member Months in 1984

## PART B

#	County	State	HMO Member Months	Non-HMO Enrollment	Total Enrollment	HMO Penetration	CPCC	CNHPCC	CHPCC	Ratio CHPCC to CNHPCC
91	Scott	Minnesota	9,252	2,229	3,000	25.70%	\$56.96	\$55.92	\$59.97	107.24%
92	Sherburne	Minnesota	6,828	1,831	2,400	23.71%	52.95	52.88	53.18	100.57%
93	Stearns	Minnesota	20,028	9,891	11,560	14.44%	50.36	48.45	61.68	127.31%
94	St Louis	Minnesota	48,876	27,799	31,872	12.78%	52.26	51.20	59.49	116.19%
95	Washington	Minnesota	18,168	5,061	6,575	23.03%	57.75	56.64	61.46	108.51%
96	Wright	Minnesota	25,320	4,065	6,175	34.17%	50.61	49.61	52.54	105.91%
97	St Louis	Missouri	41,412	108,239	111,690	3.09%	63.55	63.09	77.98	123.60%
98	St Louis City	Missouri	30,588	68,248	70,797	3.60%	60.35	60.06	68.12	113.42%
99	Clark	Nevada	28,512	43,744	46,120	5.15%	103.35	103.35	103.35	100.00%
100	Bergen	New Jersey	18,048	110,782	112,286	1.34%	77.38	77.14	95.05	123.22%
101	Burlington	New Jersey	6,420	31,247	31,782	1.68%	78.52	79.24	36.38	45.91%
102	Essex	New Jersey	8,112	93,017	93,693	0.72%	88.55	88.60	81.66	92.17%
103	Hudson	New Jersey	21,048	65,089	66,843	2.62%	81.16	81.16	81.16	100.00%
104	Hiddlesex	New Jersey	37,584	58,197	61,329	5.11%	75.94	75.94	75.94	100.00%
105	Monmouth	New Jersey	8,388	62,019	62,718	1.11%	72.81	72.85	69.25	95.06%
106	Ocean	New Jersey	10,824	82,932	83,834	1.08%	65.48	65.48	65.48	100.00%
107	Union	New Jersey	7,860	67,522	68,177	0.96%	76.99	76.99	76.99	100.00%
108	Bernalillo	New Mexico	9,984	37,202	38,034	2.19%	79.26	80.17	38.62	48.17%
109	Curry	New Mexico	6,072	3,654	4,160	12.16%	56.27	59.92	29.90	49.90%
110	Bronx	New York	179,844	117,721	132,708	11.29%	119.02	119.02	119.02	100.00%
111	Erie	New York	15,024	130,086	131,338	0.95%	55.33	55.33	55.33	100.00%
112	Kings	New York	333,360	236,313	264,093	10.52%	106.06	106.06	106.06	100.00%
113	Monroe	New York	49,404	76,932	81,049	5.08%	63.95	64.15	60.21	93.86%
114	Nassau	New York	92,736	152,130	159,858	4.83%	93.77	93.77	93.77	100.00%
115	New York	New York	188,052	167,230	182,901	8.57%	128.39	128.39	128.39	100.00%
116	Queens	New York	308,100	224,240	249,915	10.27%	96.45	96.45	96.45	100.00%
117	Richmond	New York	62,184	31,701	36,883	14.05%	100.52	100.52	100.52	100.00%
118	Suffolk	New York	59,100	120,628	125,553	3.92%	83.73	83.73	83.73	100.00%
119	Westchester	New York	63,468	109,233	114,522	4.62%	95.77	97.06	69.14	71.23%
120	Belmont	Ohio	38,628	8,906	12,125	26.55%	62.54	53.73	86.91	161.75%
121	Clermont	Ohio	6,648	8,671	9,225	6.01%	60.94	61.27	55.78	91.04%
122	Cuyahoga	Ohio	112,656	191,403	200,791	4.68%	76.75	77.63	58.83	75.78%
123	Franklin	Ohio	7,956	80,177	80,840	0.82%	64.86	65.11	34.62	53.17%
124	Hamilton	Ohio	59,940	101,279	106,274	4.70%	65.28	65.59	58.99	89.94%
125	Jefferson	Ohio	10,404	11,951	12,818	6.76%	63.36	63.36	63.36	100.00%
126	Lake	Ohio	7,500	20,073	20,698	3.02%	68.90	69.37	53.81	77.57%
127	Marion	Ohio	27,708	4,998	7,307	31.60%	66.81	51.82	99.26	191.55%
128	Clackamas	Oregon	94,860	14,423	22,328	35.40%	82.09	82.09	82.09	100.00%
129	Lane	Oregon	15,504	29,085	30,377	4.25%	65.19	66.65	32.30	48.46%
130	Marion	Oregon	22,236	28,175	30,028	6.17%	59.42	58.33	76.00	130.29%
131	Multnomah	Oregon	174,360	64,993	79,523	18.27%	74.27	73.66	77.00	104.53%
132	Washington	Oregon	25,680	17,458	19,598	10.92%	73.70	72.01	87.49	121.50%
133	Allegheny	Pennsylvania	42,840	203,372	206,942	1.73%	75.16	75.00	84.25	112.33%
134	Armstrong	Pennsylvania	11,832	11,779	12,655	8.11%	82.63	61.34	77.25	125.94%
135	Sucks	Pennsylvania	7,308	43,361	43,970	1.39%	89.61	89.62	88.90	99.20%

## Appendix D

## Development of Implied HMO Costs PMPM for Counties with Over 6,000 HMO Member Months in 1984

## PART 8

#	County	State	HMO Member Months	Non-HMO Enrollment	Total Enrollment	HMO Penetration	CPCC	CNHPCC	CHPCC	Ratio CHPCC to CNHPCC
136	Cambria	Pennsylvania	53,928	22,945	27,439	16.38%	\$75.11	\$75.11	\$75.11	100.00%
137	Clearfield	Pennsylvania	10,728	10,406	11,300	7.91%	64.56	64.56	64.56	100.00%
138	Delaware	Pennsylvania	7,080	71,417	72,007	0.82%	89.97	90.09	75.46	83.76%
139	Fayette	Pennsylvania	56,604	19,334	24,051	19.61%	74.10	74.10	74.10	100.00%
140	Greene	Pennsylvania	15,000	4,604	5,854	21.35%	75.42	75.42	75.42	100.00%
141	Indiana	Pennsylvania	24,384	9,205	11,237	18.08%	73.24	72.77	75.37	103.57%
142	Montgomery	Pennsylvania	14,652	83,654	84,875	1.44%	88.26	88.03	104.00	118.14%
143	Philadelphia	Pennsylvania	45,708	229,976	233,785	1.63%	113.89	113.89	113.89	100.00%
144	Somerset	Pennsylvania	23,256	9,442	11,380	17.03%	66.35	66.35	66.35	100.00%
145	Washington	Pennsylvania	40,800	28,059	31,459	10.81%	69.89	69.89	69.89	100.00%
146	Westmoreland	Pennsylvania	42,864	48,920	52,492	6.80%	72.49	71.09	91.68	128.96%
147	Providence	Rhode Island	22,356	83,093	84,956	2.19%	77.16	77.31	70.46	91.14%
148	Campbell	Tennessee	9,360	3,783	4,563	17.09%	60.23	60.23	60.23	100.00%
149	Carbon	Utah	8,556	1,616	2,329	30.61%	81.61	81.61	81.61	100.00%
150	Salt Lake	Utah	13,524	49,272	50,399	2.24%	59.14	59.14	59.14	100.00%
151	Arlington	Virginia	6,420	15,819	16,354	3.27%	87.40	87.40	87.40	100.00%
152	Buchanan	Virginia	7,740	1,632	2,277	28.33%	87.82	87.82	87.82	100.00%
153	Dickenson	Virginia	6,444	1,239	1,776	30.24%	71.86	71.86	71.86	100.00%
154	Lee	Virginia	8,592	2,905	3,621	19.77%	59.49	59.49	59.49	100.00%
155	Tazewell	Virginia	17,376	4,345	5,793	25.00%	75.10	75.10	75.10	100.00%
156	Wise	Virginia	14,880	3,751	4,991	24.84%	68.41	68.41	68.41	100.00%
157	District of Columbia		26,496	63,729	65,937	3.35%	104.73	104.73	104.73	100.00%
158	Clark	Washington	48,288	15,195	19,219	20.94%	66.29	64.14	74.41	116.01%
159	King	Washington	276,420	116,686	139,721	16.49%	72.99	72.26	76.69	106.13%
160	Pierce	Washington	16,104	46,286	47,628	2.82%	74.06	73.59	90.26	122.65%
161	Snohomish	Washington	34,080	29,225	32,065	8.86%	67.86	66.79	78.87	118.09%
162	Spokane	Washington	25,812	39,824	41,975	5.12%	69.56	69.56	69.56	100.00%
163	Thurston	Washington	15,948	12,698	14,027	9.47%	66.61	65.43	77.89	119.04%
164	Boone	West Virginia	12,564	1,829	2,876	36.40%	74.16	92.07	42.87	46.56%
165	Fayette	West Virginia	34,740	4,982	7,877	36.75%	73.85	90.91	44.49	48.94%
166	Greenbrier	West Virginia	7,572	4,681	5,312	11.88%	66.96	66.96	66.96	100.00%
167	Harrison	West Virginia	12,876	10,479	11,552	9.29%	57.44	57.44	57.44	100.00%
168	Kanawha	West Virginia	22,008	27,672	29,506	6.22%	59.84	59.84	59.84	100.00%
169	Logan	West Virginia	23,652	3,090	5,061	38.94%	79.58	79.58	79.58	100.00%
170	McDowell	West Virginia	27,396	3,013	5,296	43.11%	84.33	84.33	84.33	100.00%
171	Marion	West Virginia	23,064	7,976	9,898	19.42%	39.88	39.88	39.88	100.00%
172	Mercer	West Virginia	22,056	7,754	9,592	19.16%	80.81	80.81	80.81	100.00%
173	Mingo	West Virginia	14,268	2,309	3,498	33.99%	74.29	74.29	74.29	100.00%
174	Monongalia	West Virginia	13,596	5,741	6,874	16.48%	65.40	65.40	65.40	100.00%
175	Nicholas	West Virginia	7,176	2,578	3,176	18.83%	60.66	60.66	60.66	100.00%
176	Ohio	West Virginia	14,796	8,304	9,537	12.93%	56.91	56.91	56.91	100.00%
177	Raleigh	West Virginia	56,160	5,604	10,284	45.51%	72.43	99.15	40.44	40.79%
178	Wyoming	West Virginia	12,204	1,691	2,708	37.56%	82.59	103.07	48.54	47.09%
Total			10,812,936	9,628,546	10,529,624	8.56%	\$91.40	\$91.73	\$87.78	95.69%



Appendix E  
Computer Illustration  
of 1987 AAPCC Calculation  
for Delaware County, PA

This appendix provides a sample of AAPCC calculations for Delaware County, PA. Many of the numbers used in this example were obtained from the 1987 AAPCC documentation available from HCFA. Some of the detail data was not available, and had to be hypothesized in order to maintain the integrity of the aggregate data which was available.

It is possible to extract pertinent information from this sample in order to provide complete documentation of the AAPCC calculation in less than the 10 pages per county presented here. We hope that this example will be used by HCFA in an effort to enhance documentation provided to the HMO industry.

## Development of the Part A Aged HCFA AAPCC

## Input of National Data

-9

Base Year: 1984

Contract Year: 1987

## Development of National PCC for Historical Period

Calendar Year	Non-GHP Reimbursement	GHP Payments	Total Reimbursement	Enrollment	National Per Capita Cost
1980	\$20,247,020,744	\$9,587,918	\$20,256,608,662	24,834,964	\$815.65
1981	23,991,877,485	28,854,938	24,020,732,423	25,304,408	949.27
1982	29,106,127,159	73,831,384	29,179,958,543	25,840,587	1,129.23
1983	31,787,429,786	104,325,755	31,891,755,541	26,385,198	1,208.70
1984	34,301,507,212	290,066,459	34,591,573,671	26,815,760	1,289.97

## Projection Factor to Contract Period

Base Year (1984) USPCC:	\$121.74
Contract Year (1987) USPCC:	\$132.92
Projection Factor	1.0918

## Demographic Factors

Age/Sex	Institutional	Medicaid	Non-Institutional Non-Medicaid
Male			
85 & Over	2.35	2.25	1.15
80 - 84	2.35	2.25	1.15
75 - 79	2.35	2.05	1.10
70 - 74	2.30	1.70	0.90
65 - 69	2.05	1.35	0.70
Female			
85 & Over	1.95	1.85	1.05
80 - 84	1.95	1.60	1.00
75 - 79	1.95	1.40	0.85
70 - 74	1.90	1.15	0.70
65 - 69	1.65	0.90	0.60

Development of the Part A Aged HCFA AAPCC  
 Development of County Specific HMO Reimbursement For  
 Completion of County-Specific Reimbursement  
 Delaware County, Pennsylvania

Calendar Year	Name of HMO	Membership in HMO Service Area	Membership in County	Proportion of Members in County	HMO Reimbursement	Prorated County Reimbursement	Proration Method
1980	HMO / A	111,000	22,200	20.0%	\$0	\$0	Medicare membership
1981	HMO / A	170,000	22,500	13.2%	\$0	\$0	Medicare membership
	HMO / C	72,000	22,500	31.3%	0	0	Medicare membership
	HMO / D	900	5	0.6%	0	0	HMO membership
	Total	242,900	45,005		\$0	\$0	
1982	HMO / A	172,000	22,800	13.3%	\$0	\$0	Medicare membership
	HMO / C	98,000	22,800	23.3%	0	0	Medicare membership
	HMO / D	1,000	130	13.0%	0	0	HMO membership
	Total	271,000	45,730		\$0	\$0	
1983	HMO / A	177,000	22,900	12.9%	\$0	\$0	Medicare membership
	HMO / C	100,000	22,900	22.9%	0	0	Medicare membership
	HMO / D	1,400	140	10.0%	0	0	HMO membership
	Total	278,400	45,940		\$0	\$0	
1984	HMO / A	184,000	23,000	12.5%	\$0	\$0	Medicare membership
	HMO / B	2,800	140	5.0%	0	0	HMO membership
	HMO / C	115,000	23,000	20.0%	0	0	Medicare membership
	HMO / D	1,500	150	10.0%	0	0	HMO membership
	Total	303,300	46,290		\$0	\$0	

Development of the Part A Aged HCFA AAPCC  
Development of Geographic and Demographic Adjustments to the AAPCC  
1984 Base Year

Delaware County, Pennsylvania

Development of Geographic Adjustment

Calendar Year	Medicare Reimbursement					Enrollment	County Per Capita Cost	National Per Capita Cost	Geographic Factor
	FFS Providers	DRG Blending Adjustment	Adjusted FFS	GMP Reimb.	Adjusted Total				
1980	\$65,114,257	0.947593	\$61,701,814	\$0	\$61,701,814	67,285	\$917.02	\$815.65	1.12428
1981	75,560,673	0.947593	71,600,765	0	71,600,765	68,421	1,046.47	949.27	1.10240
1982	92,447,939	0.947593	87,603,020	0	87,603,020	70,023	1,251.06	1,129.23	1.10789
1983	106,580,450	0.947593	100,994,888	0	100,994,888	71,365	1,415.19	1,208.70	1.17083
1984	104,965,269	0.960000	100,766,658	0	100,766,658	72,490	1,390.08	1,289.97	1.07760

Five Year Average Geographic Factor: 1.11660

Development of Base Year Demographic Adjustment

Age/Sex	Medicare Non-HMO Members			Demographic Factors			Cross Product		
	Inst.	Medicaid	Non-Inst./Non-Medicaid	Inst.	Medicaid	Non-Inst./Non-Medicaid	Inst.	Medicaid	Non-Inst./Non-Medicaid
<b>Male</b>									
85 & Over	234	12	1,516	2.35	2.25	1.15	550	27	1,743
80 - 84	148	19	2,541	2.35	2.25	1.15	348	43	2,922
75 - 79	226	30	4,634	2.35	2.05	1.10	531	61	5,097
70 - 74	118	39	7,172	2.30	1.70	0.90	271	66	6,455
65 - 69	124	44	10,449	2.05	1.35	0.70	254	59	7,314
<b>Female</b>									
85 & Over	1,127	163	4,133	1.95	1.85	1.05	2,198	302	4,340
80 - 84	704	139	5,210	1.95	1.60	1.00	1,373	222	5,210
75 - 79	557	159	8,059	1.95	1.40	0.85	1,086	223	6,850
70 - 74	274	199	10,378	1.90	1.15	0.70	521	229	7,265
65 - 69	212	207	13,148	1.65	0.90	0.60	350	186	7,889
Total	3,724	1,011	67,240	2.009	1.403	0.819	7,481	1,419	55,085
Grand Total			71,975						63,985

Average Demographic Factor: 0.88899

## Appendix E

## Development of the Part A Aged HCFA AAPCC

Development of County Specific HMO Reimbursement For  
Development of Non-HMO Per Capita Costs

## Delaware County, Pennsylvania

1984 -- Base Year

Name of HMO	Membership In HMO Service Area	Membership In County	Proportion of Members In County	HMO Reimbursement	Prorated County Reimbursement	HMO Membership	Prorated County HMO Membership	Proration Method
HMO / A	184,000	23,000	12.5%	\$748,944	\$93,618	800	100	Medicare membership
HMO / B	2,800	140	5.0%	2,620,000	131,000	2,800	140	HMO membership
HMO / C	115,000	23,000	20.0%	936,000	187,200	1,000	200	Medicare membership
HMO / D	1,500	150	10.0%	1,404,000	140,400	1,500	150	HMO membership
Total	303,300	46,290		\$5,708,944	\$552,218	6,100	590	

Development of the Part A Aged HCFA AAPCC  
Calculation of the Normalized Non-HMO County Per Capita Cost (AAPCC Base)  
1987 Contract Year

Delaware County, Pennsylvania

	1984 Base Year	Projection Factor	1987 Contract Year
Development of County Per Capita Cost			
U.S. Per Capita Cost	\$121.74	1.09184	\$132.92
Geographic Adjustment			1.11660
County Per Capita Cost			\$148.42
Population Summary			
Non-HMO Members	71,975		
Non-HMO Members Months	863,700	1.00000	863,700
HMO Members	590		
HMO Members Months	7,080	1.00000	7,080
Total Member Months	870,780		870,780
Development of County Non-HMO Per Capita Cost			
Total Reimbursement			\$129,241,168
HMO Reimbursement	\$552,218	1.09184	\$602,931
Non-HMO Reimbursement			\$128,638,237
Non-HMO County Per Capita Cost			\$148.94
Development of County Non-HMO Per Capita Cost			
Demographic Adjustment			0.88899
AAPCC Payment Percentage			95%
Normalized County Per Capita Cost			\$159.16

## Development of the Part 8 Aged HCFA AAPCC

## Input of National Data

Base Year: 1984

Contract Year: 1987

## Development of National PCC for Historical Period

Calendar Year	Non-GHP Reimbursement	GHP Payments	Total Reimbursement	Enrollment	National Per Capita Cost
1980	\$8,597,403,933	\$186,285,545	\$8,783,689,478	24,589,079	\$357.22
1981	10,219,102,386	252,324,647	10,471,427,033	25,074,085	417.62
1982	12,201,023,953	306,190,238	12,507,214,191	25,612,267	488.33
1983	14,553,716,243	408,374,904	14,962,091,147	26,188,483	571.32
1984	15,888,434,456	559,353,918	16,447,788,374	26,652,154	617.13

## Projection Factor to Contract Period

Base Year (1984) USPC:	\$55.17
Contract Year (1987) USPC:	\$73.20
Projection Factor	1.3268

## Demographic Factors

Age/Sex	Institutional	Medicaid	Non-Institutional/ Non-Medicaid
Male			
85 & Over	1.90	1.60	1.10
80 - 84	1.90	1.60	1.10
75 - 79	1.90	1.60	1.10
70 - 74	1.90	1.45	1.00
65 - 69	1.70	1.15	0.80
Female			
85 & Over	1.70	1.25	1.00
80 - 84	1.70	1.25	0.95
75 - 79	1.70	1.25	0.95
70 - 74	1.65	1.15	0.85
65 - 69	1.50	1.05	0.70

Development of the Part B Aged HCFA AAPCC  
Development of County Specific HMO Reimbursement For  
Completion of County-Specific Reimbursement

Delaware County, Pennsylvania

Calendar Year	Name of HMO	Membership in HMO Service Area	Membership in County	Proportion of Members in County	HMO Reimbursement	Prorated County Reimbursement	Proration Method
1980	HMO / A	111,000	22,200	20.0%	\$137,945	\$27,589	Medicare membership
1981	HMO / A	170,000	22,500	13.2%	\$209,606	\$27,742	Medicare membership
	HMO / C	72,000	22,500	31.3%	172,800	54,000	Medicare membership
	HMO / D	900	5	0.6%	180,000	1,000	HMO membership
	Total	242,900	45,005		\$562,406	\$82,742	
1982	HMO / A	172,000	22,800	13.3%	\$216,215	\$28,661	Medicare membership
	HMO / C	98,000	22,800	23.3%	241,132	56,100	Medicare membership
	HMO / D	1,000	130	13.0%	322,308	41,900	HMO membership
	Total	271,000	45,730		\$779,655	\$126,661	
1983	HMO / A	177,000	22,900	12.9%	\$226,800	\$29,343	Medicare membership
	HMO / C	100,000	22,900	22.9%	251,092	57,500	Medicare membership
	HMO / D	1,400	140	10.0%	430,000	43,000	HMO membership
	Total	278,400	45,940		\$907,892	\$129,843	
1984	HMO / A	184,000	23,000	12.5%	\$251,200	\$31,400	Medicare membership
	HMO / B	2,800	140	5.0%	866,000	43,300	HMO membership
	HMO / C	115,000	23,000	20.0%	307,500	61,500	Medicare membership
	HMO / D	1,500	150	10.0%	461,000	46,100	HMO membership
	Total	303,300	46,290		\$1,885,700	\$182,300	



Development of the Part B Aged HCFA AAPCC  
Development of Geographic and Demographic Adjustments to the AAPCC  
1984 Base Year

Delaware County, Pennsylvania

## Development of Geographic Adjustment

Calendar Year	Medicare Reimbursement					Enrollment	County Per Capita Cost	National Per Capita Cost	Geographic Factor
	FFS Providers	DRG Blending Adjustment	Adjusted FFS	GHP Reimb.	Adjusted Total				
1980	\$27,527,400	1.000000	\$27,527,400	\$27,589	\$27,554,989	66,385	\$415.08	\$357.22	1.16197
1981	33,643,359	1.000000	33,643,359	82,742	33,726,101	67,547	499.30	417.62	1.19558
1982	41,842,419	1.000000	41,842,419	126,661	41,969,080	69,104	607.33	488.33	1.24369
1983	51,080,313	1.000000	51,080,313	129,843	51,210,156	70,707	724.26	571.32	1.26769
1984	56,494,469	1.000000	56,494,469	182,300	56,676,769	71,930	787.94	617.13	1.27679
Five Year Average Geographic Factor:									1.22914

## Development of Base Year Demographic Adjustment

Age/Sex	Medicare Non-HMO Members			Demographic Factors			Cross Product		
	Inst.	Medicaid	Non-Inst./Non-Medicaid	Inst.	Medicaid	Non-Inst./Non-Medicaid	Inst.	Medicaid	Non-Inst./Non-Medicaid
<b>Male</b>									
85 & Over	252	13	1,461	1.90	1.60	1.10	479	21	1,607
80 - 84	158	22	2,506	1.90	1.60	1.10	300	35	2,757
75 - 79	243	43	4,570	1.90	1.60	1.10	462	69	5,027
70 - 74	128	53	7,090	1.90	1.45	1.00	243	77	7,090
65 - 69	135	59	10,204	1.70	1.15	0.80	230	68	8,163
<b>Female</b>									
85 & Over	1,223	166	3,936	1.70	1.25	1.00	2,079	208	3,936
80 - 84	755	158	5,108	1.70	1.25	0.95	1,284	198	4,853
75 - 79	603	216	7,982	1.70	1.25	0.95	1,025	270	7,583
70 - 74	296	263	10,300	1.65	1.15	0.85	492	302	8,755
65 - 69	232	267	12,973	1.50	1.05	0.70	348	280	9,081
<b>Total</b>	<b>4,027</b>	<b>1,260</b>	<b>66,130</b>	<b>1.724</b>	<b>1.212</b>	<b>0.890</b>	<b>6,941</b>	<b>1,527</b>	<b>58,852</b>
<b>Grand Total</b>			<b>71,417</b>						<b>67,320</b>

Average Demographic Factor: 0.94263

Development of the Part B Aged HCFA AAPCC  
 Development of County Specific HMO Reimbursement For  
 Development of Non-HMO Per Capita Costs  
 Delaware County, Pennsylvania

1984 -- Base Year

Name of HMO	Membership in HMO Service Area	Membership in County	Proportion of Members in County	HMO Reimbursement	Prorated County Reimbursement	HMO Membership	Prorated County HMO Membership	Proration Method
HMO / A	184,000	23,000	12.5%	\$551,632	\$68,954	800	100	Medicare membership
HMO / B	2,800	140	5.0%	1,900,000	95,000	2,800	140	HMO membership
HMO / C	115,000	23,000	20.0%	675,000	135,000	1,000	200	Medicare membership
HMO / D	1,500	150	10.0%	1,010,000	101,000	1,500	150	HMO membership
Total	303,300	46,290		\$4,136,632	\$399,954	6,100	590	

Development of the Part B Aged HCFA AAPCC  
Calculation of the Normalized Non-HMO County Per Capita Cost (AAPCC Base)  
1987 Contract Year

	1984 Base Year	Projection Factor	1987 Contract Year
Development of County Per Capita Cost			
U.S. Per Capita Cost	\$55.17	1.32681	\$73.20
Geographic Adjustment			1.22914
County Per Capita Cost			\$89.97
Population Summary			
Non-HMO Members	71,417		
Non-HMO Members Months	857,004	1.00000	857,004
HMO Members	590		
HMO Members Months	7,080	1.00000	7,080
Total Member Months	864,084		864,084
Development of County Non-HMO Per Capita Cost			
Total Reimbursement			\$77,741,637
HMO Reimbursement	\$399,954	1.32681	530,662
Non-HMO Reimbursement			\$77,210,975
Non-HMO County Per Capita Cost			\$90.09
Development of County Non-HMO Per Capita Cost			
Demographic Adjustment			0.94263
AAPCC Payment Percentage			95%
Normalized County Per Capita Cost			\$90.79

Appendix F

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APPENDIX C.

PAPER ON AAPCC GEOGRAPHIC RECONFIGURATION,  
PREPARED BY JAMES BEEBE (HCFA)

## AAPCC GEOGRAPHIC RECONFIGURATION

### Background

A basic tenet behind the PHPO initiative is that decentralization of health care management to a multiplicity of competing private plans will both reduce the overall cost of the Medicare program as well as provide more flexibility in meeting individual health care needs without a sacrifice in quality. It follows that increasing the number of competitive plans enrolling Medicare beneficiaries will work toward this goal. Thus, the payment mechanism should encourage PHPO participation while not inhibiting the potential of this initiative for achieving efficiency and flexibility. The concern of the present research is whether a change in the geographic area for which the AAPCC is calculated would work toward achieving these goals.

### Current Geographic Configuration

Currently the AAPCC is based on the county, a geographic unit chosen largely because it is traditionally the smallest area for which data is compiled in HCFA. County boundaries are generally believed to be only loosely related to economic factors affecting HMO costs and Medicare beneficiaries' health needs. This project examines alternative systems of defining geographic areas.

### Criteria for Reconfiguration

The project will aggregate data from five-digit zip code areas to larger areas in a manner which attempts to be consistent with three criteria:

1. Within-area homogeneity of FFS health care costs as measured by Medicare FFS reimbursements. Areas with wide variation in costs are more susceptible to biased selection and inaccurate payment.
2. Temporal stability. The group for which the rate is being set must be large enough to have only small year-to-year chance fluctuations.
3. Across border stability. Adjacent areas should not have large differences in their rates. Such differences seem illogical to HMO's who draw enrollees from areas with highly different rates but observe little or no cost differences related to area of residence.

Two of the criteria, homogeneity and small boundary differences, are inconsistent with one another. Increasing within-area homogeneity will necessarily increase between-area differences. The criterion of homogeneity applies to FFS Medicare reimbursement which may or may not be highly correlated with HMO costs. Any difference between FFS costs and those of an HMO is not a problem from the point of view of accuracy of payment so long as accuracy is defined in terms of FFS costs. But it may be a factor for the HMO when considering whether to participate in the program.

While stability is a desirable quality for HMO planning purposes, a more direct concern to the HMO should be that its enrollee group is large enough that the simultaneous chance occurrence of a few very high cost patients does not threaten the viability of the business. If the areas for which different rates are established have small Medicare populations, then the rates will be relatively unstable. But, if an HMO draws a large enough group

dispersed across many of these areas, the average payment to the HMO should be relatively stable over time. On the other hand, if an HMO draws from a single rate area, any year-to-year instability in that area's rate will be reflected in that HMO's payment.

In conclusion, of the three criteria, within area homogeneity is the one with the most direct effect on accuracy of payment. Temporal stability of payment rates is desirable for planning purposes, but it may be even more important for the HMO to achieve this by enrolling large enough groups. The boundary problem appears to be one of the HMOs' perception, but it may, nevertheless, be a factor in their participation decision.

#### Evaluation of New Areas

How do we know whether our new areas are better than the old? At one level the answer is simple. Homogeneity, temporal stability, and boundary differences are all measurable. All that is needed is to measure and compare them.

At a more important level--the furtherance of our basic goals--the question is more difficult to answer. With the current Medicare HMO's, we can measure losers and gainers under a new system before it is implemented. If it appears that the change will be a great shock to the system, it could be phased in or simply not implemented. (It should be noted that if HMO's generally achieve favorable selection, improved accuracy in the AAPCC will create more losers than winners.) Certainly we would want to get the reaction of the industry. If the change would result in losing 50-percent of existing HMO's, then perhaps it should not be implemented. On the other hand, if the new system lost 50-percent of existing HMO's, but brought in twice that many, then there would be a net gain, but such a reaction would be difficult to predict. Ultimately, the only possibility of knowing what effect a geographic reconfiguration would have is to implement it and see what happens. Even then, it will be difficult to assess to what extent the change in areas has resulted in favorable or unfavorable changes in the program.

APPENDIX D.

PAPER ON PROPOSALS FOR CHANGING THE WAY MEDICARE PAYS HMOs,  
PREPARED BY JAMES LUBITZ (HCFA)

## Four Proposals for Changing the Way Medicare Pays HMOs

Four proposals have been made for changing the way Medicare pays HMOs. They stem from a belief that the government should improve the method used to pay HMOs in two respects. First, a payment method is needed that better deals with biased selection into HMOs, either of healthier or sicker people, to protect both HMOs and the Medicare program against financial loss. Second, a payment method is needed that lessens the incentives for underservice in the current AAPCC formula. The first of the four proposals maintains the purely prospective nature of the current AAPCC; it simply introduces a new adjustor. The other three proposals introduce some aspect of retrospectivity into the payment method.

### 1. A prior use adjustment to the AAPCC.

Work is underway at Boston University (BU) to develop two models using information on hospital diagnosis in a base year to adjust capitation payments in the future. The first model adjusts for diagnoses predictive of high future costs. To reduce the opportunity for gaming, the second model adjusts only for hospitalizations that are relatively non-discretionary. This model could be used for payment after a person enrolls in an HMO.

Implementation: BU's work should be completed by December, 1987. Then the model could be tested in demonstrations. Data on hospital diagnosis is collected for all fee-for-service (FFS) admissions and HCFA is attempting to collect data on all HMO admissions. Thus, data for implementation should not be a problem.

HMO acceptance: Should be positive in general because preserves prospective nature of payment. HMOs experiencing favorable selection may be opposed.

Policy concerns: Some feel a prior use adjustment may increase opportunity for gaming by HMOs.

### 2. Capitation-FFS blend (J. Newhouse).

Newhouse has proposed that HMOs be paid a percentage of the current or of a refined AAPCC and that the rest of their payment be based on FFS. The actual percentage of each would depend on such considerations as the accuracy of the AAPCC and policy goals. A blend would balance the incentives for overservice in FFS and for underservice in capitation. The blend also recognizes the imperfect nature of predictive formulas. In effect, this method recognizes changes in health status as they occur rather than in next year's payment, as in a prior use formula.

Implementation: Little additional research would be required to implement this model either in demonstrations or program-wide. There might be operational problems in collecting FFS bills (and possibly cost data, too) from HMOs. This would be a major change for many HMOs. Dealing with FFS bills from HMOs should not be a major problem for HCFA.

HMO acceptance: a. HMOs would object to submitting bills. b. TEFRA increased HMO participation by making payments entirely prospective. Would introducing retrospectivity decrease HMO participation?

Policy concerns: Dampens the appeal of capitation as a cost-containment mechanism.

3. Prospective payment (PPS) for high cost cases (A. Enthoven)

Enthoven has proposed that Medicare pay HMOs according to the present AAPCC formula with about 50 high cost DRGs factored out. If an HMO has an admission in one of the 50 DRGs it would receive the DRG payment (increased to also cover the cost of post-hospital care.) The idea is that a lot of costs are accounted for by a few high-cost cases for whom there is little discretion about treating. Separating out these cases will remove the incentive to discriminate against the sick and will reduce the remaining variance in health care costs that the AAPCC needs to deal with.

Implementation: Research is needed to specify which DRGs should be factored out. Since HMOs are supposed to report hospital stay information to HCFA, data to implement should be available. A method must be developed to assign post-hospital costs to hospital stays.

HMO acceptance: Same concern as proposal 2--effect of retrospective payment system on participation.

Policy concerns: a. Dampens incentive for cost-containment.

b. Expensive DRGs are mostly surgical stays (see attached table). There is an element of discretion in the choice of some surgical treatments. If the goal of the proposal is to take costly, low discretion cases, out of capitation, criteria have to be developed to identify such cases. (Perhaps similar to Proposal 1, second model). If goal is to remove incentive to underserve costly cases, perhaps expensive, discretionary cases should be included.

4. Reinsurance (Milliman and Robertson (M and R), Brandeis)

The rationale behind this approach is that cost differences among morbidity classes are due to a large extent to differences in the frequency and cost of catastrophically expensive hospital episodes. These catastrophic cases can be managed to some degree, but not avoided. Thus, it is believed that they can be partially reinsured through a stop-loss approach, with little loss of financial incentives for cost containment.

The approach would work as follows. An annual stop loss limit for Part A costs would be set, say at \$10,000 per enrollee. A coinsurance percentage would also be set, say 20%. For cases exceeding \$10,000 in annual Part A costs, the government would reimburse the HMO 80% of costs and the HMO would be responsible for 20%. An amount equal to 80% of estimated Part A costs for persons exceeding \$10,000 in a year would be removed from the AAPCC capitation. (This is equivalent to a reinsurance premium.) HMOs with lower than average incidence of high cost cases (favorable selection) would get back less in reinsurance payments than they pay in premiums, thus dampening the effect of favorable selection. HMOs with higher than average incidence of high cost cases would be directly compensated for part of their costs, thus dampening the impact of unfavorable selection. A large part of



HMOs' payment would come from reinsurance. The actual proportion would be a policy decision. In the M and R proposal reinsurance would cover 50% of Part A costs.

Implementation: Little additional research is required to implement this model in demonstrations or program-wide. The proposal is limited to Part A costs to make implementation easier. DRG payments could be used to measure Part A costs. If proposal were extended to all costs, there could be problems in collecting FFS bills and cost data from HMOs.

HMO acceptance: Same concern as proposal 2--effect of retrospective payment system on participation.

Policy concerns: Similar to proposal 3. There may be a lot of discretion in how high cost cases are treated.

A general policy concern of all four proposals is that, assuming HMOs generally experience favorable selection, all the proposals might reduce payments to HMOs. This could reduce both HMO participation and Medicare enrollment in HMOs since HMOs would have less money to offer extra benefits to attract enrollees.

APPENDIX E.

MEMORANDUM, "HEALTH STATUS ADJUSTMENTS TO THE AAPCC",  
PREPARED BY DR. LEONARD GRUENBERG (BRANDEIS UNIVERSITY)

MEMORANDUM

TO: AAPCC Study Panel Members

FROM: Leonard Gruenberg, Bigel Institute, Brandeis University

DATE: August 3, 1987

SUBJECT: Health Status Adjustments to the AAPCC

I am writing this memorandum in order to comment on the recommendations on "health status adjustments" contained in the draft of the Milliman and Robertson report. I differ from the conclusions reached in the draft report, because the diagnostic group model does not capture the major differences in health care costs among elderly.

My analyses of the medical care utilization patterns of elderly and data which has only recently come to light have led me to confirm ideas that I have had for some time now. If "health status" is built into the AAPCC, it must reflect the major differences in utilization patterns that are found among the elderly. Specifically, there we need to include special consideration for the costs of the "frail elderly."

Data obtained from long-term care and other demonstration programs (attached) shows that individuals found to be in need of long-term care have very high acute care costs. If we base an estimate of a frail elderly underwriting factor on the (relative) number of acute care hospital days for the frail, we would conclude that the frail elderly would have an underwriting factor of 4 or more. Their acute care costs are much higher than the average costs of persons who were hospitalized recently for a chronic-type diagnosis.

An AAPCC based upon the occurrence of a hospitalization associated with one out of a list of chronic diagnoses leads to an underwriting index of about 2 for the high-cost group. This represents a considerable underestimate of the relative costs for "frail" elderly.

A more appropriate health status model would include separate ratings for the following four groups:

- (a) Well elderly - an AAPCC rate-book based upon age and sex could be used
- (b) Medically unstable elderly - this group would include individuals who had a recent hospitalization for a specified set of diagnoses
- (c) Frail elderly - this group would include individuals who, because of their overall condition are found to require 24-hour care from a family member or in a nursing home.

(d) Frail, medically unstable elderly - this group would include individuals who are frail and who had a recent hospitalization, as in b above. The data (cited below) show that the medical care costs of "frail elderly" are considerably higher. For this reason, a special rate-cell for "frail elderly" needs to be included in any health-status based AAPCC.

Attachment to Memorandum on Health Status Adjustments and the AAPCC:  
L. Gruenberg, August 6, 1987

1. Data on Acute Care Hospital Use Rate of "Frail" Elderly.

The data in Table 1 summarizes the hospital utilization experience found in a number of long-term care demonstration projects.

The underwriting factors are estimates. They were found by dividing the observed hospital utilization rates by those observed for the Medicare population in the county or State where the program took place.

PROGRAM	ACUTE HOSPITAL UTILIZATION	UNDERWRITING FACTOR
NYC Home Care Project	20,640 days/1000	4.54
LTC Project of North San Diego	12,480 days/1000	4.42
South Carolina Community LTC	44,520 days/1000	15.13
ACCESS, Monroe County, New York	22,200 days/1000	6.41
On Lok CCODA, Comparison group	12,720 days/1000	4.04

2. Proposed Method for Implementing "Frailty-Adjusted" AAPCC

Physicians in the community could be asked to identify and certify elderly who are regarded as needing 24-hour care because of their functional status and medical conditions. It is recommended that the criteria used should be the same as that employed by Medicaid to certify nursing home eligibility.

The physician's declaration would need to be verified by an independent functional assessment. Once an individual was certified, the appropriate rate would be valid for a period of six months. A single follow-up assessment would be carried out after this six month interval. If this assessment confirmed the initial one, then a permanent classification could be established.

3. Data sources

Data from the 1982 and 1984 national long-term care surveys could be used as a source of data for establishing a frailty-adjusted AAPCC. These data are currently being analyzed by Kenneth Manton for HCFA.

APPENDIX F.

MEMORANDUM, "GEOGRAPHIC UNITS",  
PREPARED BY DR. HAROLD LUFT  
(UNIVERSITY OF CALIFORNIA AT SAN FRANCISCO)

August 11, 1987

To: AAPCC Study Panel

From: Hal Luft

Re: Geographic Units

It would appear that geographic market areas should be contiguous and be reasonably homogeneous with respect to the chosen dependent variable. The following outlines a method that might be useful in defining such market areas. Note that we are sometimes interested in components of large markets such as the San Francisco Bay Area to prevent HMOs or CMPs from geographic cream skimming.

Suppose that Medicare reimbursements are available on a 5 digit ZIP code basis. (Average data for several years would be better than single year data, but the proposed approach will attempt to reduce the influence of random variations in small populations.) The goal is taken as the identification of ZIP code clumps which result in a reduced coefficient of variation across ZIPs within a clump.

Given the historical precedent of using county-based data, it may be helpful to begin with counties as the starting point. While ZIP codes do not always fit within county boundaries, one can generally allocate ZIPs to counties on a majority population basis. (This has typically been done by researchers working at the census tract or block level.) The coefficient of variation (CV) is the standard deviation divided by the mean. Since the ZIP code reimbursement rates are based on populations of varying size, the CV calculations should use each ZIP code's rate weighted by the number of beneficiaries. This reduces the effects of random variations due to small populations.

In the metropolitan area shown in Figure 1, county A has generally the highest reimbursement levels and there is a relatively small difference among the ZIPs within it. While counties B, C, & D might be termed the suburban ring, B and C each contain several ZIPs with rather low reimbursement rates and B even includes the most expensive ZIPs in the SMSA.

The proposed algorithm would compare each ZIP to the clump of which it is a part and to neighboring clumps. It may be best to start the process with the county having the lowest CV as a base, then examine contiguous ZIPs, beginning with the one with the highest CV to see if trades can be made to reduce the resultant CV's. First, test each of the border ZIPs, B1, B2, B3, C1, ... and compute the CV for the remaining B ZIPs if each were omitted, in turn, and likewise the CVs for A, if each were added, in turn. Choose the one transfer which produces the greatest reduction in weighted CV across the four counties. This might be to transfer C<sub>1</sub> from clump C to clump A. Repeat the process with the redefined clumps and bordering ZIPs, e.g. C2 and B4 now border on clump A and could be considered for transfer. The process should result in the inner portions of B and C being transferred to A.

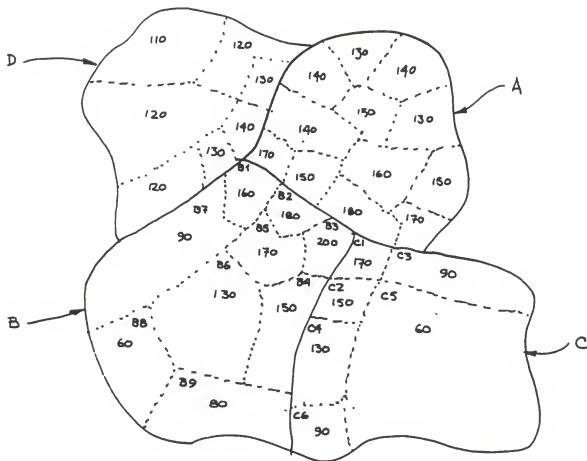
After the cycling of transfers, one would probably want a

"cleanup" phase, in which small population clumps (possibly the remaining Zips from county clumps), were collapsed into larger clumps. At this stage, adjacent "rural counties (not shown) may be added to the choice list or transfers could be forced from among a more limited set of options. (For example, HMOs or CMPs may argue for some constraints on the extent of the relevant territory.)

This approach is admittedly experimental and half-baked. It is not clear whether markedly different results arise depending upon the starting points or the local configuration of ZIPs and reimbursement patterns. The basic programming should not be too difficult if there is an easy way of identifying contiguous ZIP codes. (Logically, this should be coded somewhere. If not, one can easily identify nearby ZIPs, i.e. within X miles, and choose the closest as being probably contiguous, but there will be some holes.)

Note, this example used Medicare reimbursement rates as the focus of attention, in keeping with current AAPCC practice. An alternative would use factor cost, say average nurse wage rates paid by hospitals used by residents in each ZIP. It would be a relatively simple exercise to use patient flows from ZIPs to hospitals to derive weighted average of nurse wages (or any other hospital-based variable.





Letters (A, B...) represent counties

Letter/Numbers (B1, B2, ...) represent ZIP code areas

Numbers (60, 90, 170...) represent indexed reimbursements

APPENDIX G.

MEMORANDUM, "PROPOSED RECOMMENDATIONS ON REVISING THE  
INSTITUTIONAL STATUS FACTOR FOR THE AAPCC",  
PREPARED BY KAREN WINTRINGHAM (GROUP HEALTH COOPERATIVE OF PUGET SOUND)

To: AAPCC Study Panel

From: Karen Wittingham

SUBJECT: Proposed Recommendation on Revising the Institutional Status Factor for the AAPCC

At our meeting on August 6th I offered to provide additional information about the current inadequacies of the institutional factor currently used to adjust the AAPCC. I apologize for providing the information in a handwritten memo, but I haven't returned to my office since before the 6th.

Since we began our risk contract in October, 1976 Group Health Cooperative has been requesting information to help explain the calculation of the AAPCC. Not until <sup>late</sup> 1985 did we receive any detailed information on AAPCC's applied to Group Health. Once we received the information, we were able to identify errors made in the determination of institutional status. Since that determination we have invested significant effort in understanding the calculations and recreating prior years' data.

Before describing, to the extent we understand it, the process used to determine institutional status under Medicare TERRA-risk

contracts, let me note our own conclusions:

1. The precise methods used by HCFA to adjust community institutional data are not fully understood by us. However, it does appear that a combination of assumptions, forecasts, and estimates are used.
2. In contrast, the HMO is required to generate precise, & 100% verifiable institutional counts to HCFA on a monthly basis. The inevitable result is increased cost for the HMO.
3. Changes implemented by HCFA which will take effect October 1<sup>st</sup> further restrict HMOs' ability to determine the institutional status of members. HMOs will be forced to undercount actual institutionalized members to a greater extent than already resulting from item #2.

#### Data Sources

As noted earlier, we still do not fully understand the data and techniques used by HCFA to determine the community

institutional factors. HCFA should have the opportunity to correct any misunderstandings we might have or might express in this memo.

It appears the data sources used for the community institutional factor changed in very recent years (1986?). Prior to that year the primary data source was survey data. The change to census data undoubtedly increased the completeness of the counts, at least in the year the census was taken. In turn, any improvement in the community counts (a higher number) has a potential for decreasing payment to the HMO.

One can hardly question the use of more complete data in the calculation of the RRPCC. It is mentioned, rather, to indicate a change which corresponded to measurable decreases in reimbursement to participant HMOs. It is raised in contrast to the comparable data available to the HMO. Finally, it is raised to question what assumptions and adjustments are made by HCFA for each of the nine years between the Censuses.

In marked contrast to the community institutional data, the HMO is required to supply 100% verifiable institutional data on a monthly basis. In a particular month's report, the HMO may include anyone institutionalized on the 1<sup>st</sup> of that month

and in at least the 29 prior days. The data must be received by HCFA by the 12th or 30 of the month (one week later if submitted on tape). The HMO, thus, has fewer than two weeks to prepare this data.

It might be noted that this schedule does not differ from that already met by the HMO for accretions and deletions of beneficiaries to the risk contract. The critical difference, however, is in the source of the data. Unlike the accretion/deletion process, the HMO has no ready means to know if a member has entered or left an institutional residence.

Several potential sources of information are available to the HMO to try to create a listing of qualified institutional residents:

1. The HMO may be called upon to pay for a lab test or X-ray or some durable medical equipment for a nursing home patient.
2. Medical care may be needed by a resident, and might be rendered either by an HMO physician or a community physician.

3. A few HMOs including ours provide coverage for outpatient prescriptions. If a member has such coverage and if they request a prescription from us, we mail the material to the nursing home.
4. Even fewer HMOs with large Medicare enrollments have established routine rounding systems for their institutionalized members. Using these rounds take place only at homes with significant numbers of residents who are enrolled in the plan.
5. If placements are made by HMO personnel (usually in the few HMOs that operate hospitals) the HMO may have logs of who was placed and when the admission occurred.

In short, none of these sources will identify all institutionalized members. None will automatically verify residences every month. And none would be available in time to meet HCFA's schedules; in large measure they allow only retroactive verification of continued residences. As of October 1st, the ability to use retroactive adjustments also ceases, again hampering the HMOs' abilities to identify individuals for whom legitimate and significantly higher reimbursement would have been paid. In fact, the only means

available to determine with 100% verifiability and no retrospective adjustments would be phone calls on a monthly basis to, in our case, in excess of 100 nursing homes. That also requires extra work by each home, also on a monthly basis.

It also appears that in the future HKFA will undertake verification efforts requiring the actual name of the home for each month. In our case, and we expect in other HMOs as well, we would have to undertake extremely expensive reprogramming efforts to allow recording of the institution's name and institution history on a manual system.

One final observation derived from our efforts. Once an individual enters a home and remains at least 30 days, they remain for many months or years.

### Recommendation

The following reflects a summary of recommendations that would address our experiences and concerns:



1. That HCFA disclose the data source, and the assumptions and methods used to determine the institutional costs used in the AARCs,
2. That HCFA determine alternative data collection requirements for institutional residency of HMO members that are less onerous, considering options including but not limited to annual or semi-annual reporting and retroactive adjustments, and
3. That HCFA develop as quickly as possible an alternative means of adjusting for the use of health services by institutionalized beneficiaries. The alternative should meet at least the following objectives:
  - a. achieve better accuracy,
  - b. eliminate undue burdens on the HMO, and
  - c. incorporate incentives which do not penalize HMOs who develop services which help avoid institutionalization.

APPENDIX H.

MINUTES OF PANEL MEETINGS

AAPCC STUDY PANEL  
MINUTES OF FIRST MEETING  
JUNE 19, 1987

## FOREWORD

The Omnibus Budget Reconciliation Act of 1986 (OBRA) mandated a study, "through contract with an appropriate organization", of the methods by which the average adjusted per capita cost (AAPCC), as defined in the Social Security Act and applied to Medicare risk contracts with HMOs, "can be refined to more accurately reflect the average cost of providing care to different classes of patients." The Act further states that "the Secretary shall submit to Congress, by not later than January 1, 1988, specific legislative recommendations concerning methods by which the calculation of the AAPCC can be refined."

The tightness of this deadline precludes the possibility of a full-blown research study. As an alternative, HCFA has arranged for a report to be prepared by the actuarial firm of Milliman and Robertson on potential improvements for refining computation of the AAPCC and has convened a panel of experts, consisting of health care actuaries, economists, and statisticians, as well as representatives of several HMOs, to review the Milliman and Robertson report and to provide summary opinions for HCFA's use in developing the required legislative recommendations.

The fourteen members of the AAPCC Study Panel are identified in Exhibit I. The minutes of their first meeting, held in Washington, D.C. on June 19, 1987, are contained on the pages which follow.

Exhibit I. AAPCC STUDY PANEL MEMBERS

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AAPCC Study Panel Meeting  
June 19, 1987  
HHS North Building, 5th Floor  
330 Independence Avenue, S.W.  
Washington, D.C.

MINUTES

1. All members of the Study Panel, with the exception of Dr. Harold Luft, were present. A full list of attendees, including HCFA representatives, guest speakers, and other participants, is presented in Exhibit II.
2. Dr. Joseph Antos, Director of the HCFA Office of Research and Demonstrations, welcomed the panel and other attendees with a broad statement of the panel's objectives and timetable. There were to be two panel meetings. The first, held today, will consider a set of technical issues defined by the actuarial firm of Milliman and Robertson (M&R), and expand upon or modify those issues based on a review and discussion of ongoing research in the field. The focus of the meeting will be to define a plausible set of options for improving computation of the AAPCC. M&R will produce a technical report covering these items for consideration by the Study Panel at a second meeting to be held in August. Following the second meeting, the panel's recommendations and the M&R report will be synthesized into an overall summary by The Circle, Inc., prime contractor for this effort, and submitted to HCFA for their use in responding to the OBRA legislative mandate.
3. Following these remarks, Dr. Antos introduced Dr. Joseph Newhouse, the panel chair. Dr. Newhouse briefly identified the five major topics on today's agenda:
  - a. Criteria for evaluating AAPCC improvements.
  - b. USPCC issues -- ways (if any) of improving the USPCC projection process.
  - c. Geographic issues -- alternatives to the use of the county as the basic geographic unit.
  - d. Selection issues -- ways of safeguarding HMOs against adverse selection and the government against favorable selection and possible discriminatory HMO practice.

## Exhibit II. ATTENDEES

1. AAPCC Study Panel

Of the panel members listed in Exhibit I, only Dr. Harold Luft was not present.

2. HCFA

Joseph Antos  
Thomas Ault  
James Beebe  
William England  
J. Michael Fitzmaurice  
Sydney Galloway  
Marian Gornick  
James Hadly  
Mary Kenesson  
Thomas Kickham  
Guy King  
Jack Langenbrunner  
James Lubitz  
Clifton Maze  
Michael McMullen  
Alma McMillan  
Renee Mentnech  
Jerry Riley  
Barbara Rosenberg  
Harry Savitt

3. Office of Assistant Secretary for Planning and Evaluation (ASPE)

George Greenberg  
Wilhelmine Miller  
M. Eugene Moyer

4. Other Government Agencies

Leslie Clune, Office of General Counsel/DHHS  
Marilyn Field, Physician Payment Review Commission  
Mark Miller, Office of Management and Budget

5. Universities and Private Sector

Arlene Ash, Boston University Medical School  
John Cookson, Milliman and Robertson  
Randall Ellis, Boston University  
Frank Porell, Brandeis University

6. The Circle, Inc.

Leonard Greenberg  
Daniel Tisch

- e. General issues -- relation of AAPCC payment mechanisms to new catastrophic proposals, etc.

Dr. Newhouse announced several planned presentations. The discussion of geographic issues will be preceded by a talk by Dr. Frank Porell of Brandeis University, and the discussion of selection issues by Dr. Ken Manton of Duke University and Dr. Arlene Ash of Boston University. The first topic on the agenda, AAPCC evaluation criteria, will be led off by Earl Whitney of M&R.

#### 4. AAPCC Evaluation Criteria

Mr. Whitney suggested thirteen criteria for assessing improvements to the AAPCC computation process. They are:

- a. Accuracy, which Mr. Whitney suggested might be defined as the absence of bias
- b. Simplicity and understandability
- c. Temporal stability
- d. Practicality (Can the process be made to work?)
- e. Data availability (Do the needed data exist? Can they be made to exist?)
- f. Susceptibility to abuse (either deliberate or serendipitous)
- g. Selection and anti-selection
- h. Effect on current HMO market
- i. Effect on future viability of HMOs
- j. Prospectivity vs. retrospectivity (Does the process preserve one of the major advantages of the current system, i.e., prospectivity?)



k. Nature of needed changes (legislative vs. regulatory)

l. Cost to the U.S. government

The final criterion mentioned by Mr. Whitney was perhaps less a "criterion" than a caution; it dealt with the four possible decision options that might emerge from these deliberations. Depending on the changes proposed, any of the following options were possible:

- (1) Implement the changes immediately.
- (2) Test the changes via demonstration(s).
- (3) Test the changes by reviewing data from existing contractors.
- (4) Shelf the changes -- not worth pursuing at the present time.

In discussing Mr. Whitney's criteria, several themes emerged. Harry Sutton suggested that the problem of "inaccurate" AAPCCs might be solved by letting the HMO charge enrollees for the difference between what it receives from the government (the AAPCC) and its own estimate of what it needs to turn a profit, or to survive. Others, however, expressed concern that the price differential might be too great for the public to accept, defeating the HMO's ability to market.

Kathy Langwell voiced concern as to the implications of any proposed AAPCC changes on Medicare beneficiaries. Changes that encourage an HMO to reduce its benefits might be harmful to enrollment prospects and cause political fallout.

Additional discussion centered on the definition of "accuracy". Several panelists equated accuracy with the absence of bias (i.e., if the expected value is correct, what's the problem?). Others focused at least equally on the issue of variance, expressing concern that even if there were no bias, HMOs might shun risk contracts if the variability were so great as to raise the possibility of unacceptable losses.

Pursuing the issue of variability and loss, Dr. Newhouse noted the distinction between total variance and predictable variance. The goal of ongoing research is to predict expected expenditure (not actual) insofar as HCFA feels the expenditure represents appropriate use. The use of  $R^2$  as a measure of accuracy assumes the loss function to be symmetric (i.e., losses and gains are weighted equally), and that losses are measured in squared, as opposed to absolute or other, terms.

Mr. Whitney expanded the discussion from accuracy to stability, noting that a process with seemingly "good" predictive power that nonetheless results in substantial changes from year to year would not be perceived as accurate and would certainly not be conducive to HMO acceptance.

The final segment of this portion of the agenda was devoted to the issue of Congressional intent. Andrew Wang and Guy King recommended the panel focus on the original definition of the AAPCC -- that it be actuarially "equivalent" to what would have been paid in the fee-for-service sector. Mr. King voiced the opinion that the Congressional mandate provides carte blanche for the panel to consider any adjustments it deems appropriate to achieve actuarial "equivalence". Marian Gornick, speaking for the HCFA Office of Research and Demonstrations, noted that those adjustments might well lie in the three items of research to be discussed today: the geographic reconfiguration work of Dr. Porell; the prior use model, updated for post-PPS data, to be discussed by Dr. Arlene Ash; and the work of Dr. Manton to develop new weights using 1982/1984 survey data. It was clearly recognized, however, that the deliberations of the panel should by no means be restricted to these three efforts.

## 5. USPCC Issues

Again leading off the discussion, Earl Whitney expressed concern regarding several timing issues which he felt affected, and perhaps biased, computation of the USPCC. His major concerns, echoed by several others, included:

- a. Timing of the computation. - Given that the USPCC is projected after the budget reconciliation process, at a time when certain assumed program savings have been cast in concrete, does the assumption of those savings bias the resulting computation?
- b. Projection time lags. - How current are the data on which the projection is based? How long is it until the incurred Medicare claims are fully complete? What sort of bias do these delays create?
- c. Retrospective adjustment. - Given these and other possible sources of bias, should there be a retrospective adjustment mechanism to account for projections which prove to be incorrect?

Guy King, Director of HCFA's Office of the Actuary, described the processes and assumptions used by his office in developing the USPCC. On the matter of timing, he noted that:

- (1) Any program savings assumed in the budgetary process have no bearing on the USPCC computation, i.e., will not be considered unless and until the corresponding legislation has been passed.
- (2) If the legislation is in place but the regulations are not, then as long as the legislation requires regulations by a certain date, the Office of the Actuary assumes that that date will be met and that any consequent savings will be realized.
- (3) Any bias resulting from legislation passed after the USPCC projection has been made generally works to the HMOs' advantage, since Congress (in this arena at least) usually passes legislation that saves rather than spends money.

On the issue of time lags, Mr. King described the historical reconstruction process his office goes through to estimate incurred Medicare claims based on payments as of a certain date. The process differs for Parts A and B and typically involves a time lag of two or more years. Projections for 1988, for example, are based on data for calendar year 1986 which are, in turn, only about 75% complete at the time of projection. Despite the incompleteness of the data, however, Mr. King stated that historical experience permits reasonable projections to be made; projections for the past two years have been "within a percent or two". A recent report to the Deputy Administrator, covering the period 1984 through 1986, showed that almost without exception, for both Part A and Part B, payments based on the projected USPCC were in the HMOs' favor -- were slightly higher than HCFA's current best estimate based on data that are now essentially complete.

Retrospective adjustment, although largely a policy issue, was acknowledged to be relevant to the panel's deliberations. Gordon Trapnell defined two schools of thought, stating he tended to favor retrospective adjustments since they are "usually made much more honestly than prospective estimates". Others, however, felt that retrospective adjustment would be politically unacceptable. Harry Sutton repeated his earlier point that retrospective adjustment would not be necessary as long as the HMO knows in advance what its income will be and is permitted to charge enough to compensate for any shortfall. Karen Wintringham expressed concern regarding the use of supplemental premiums as a safety valve, stating there could be a significant impact on the senior enrolled population if the premiums are either too high or are permitted to vary radically from year to year. She stated she would prefer up-front refinements to the AAPCC computation process (such as those being considered today) which would obviate the need for retrospective adjustment. These statements appeared to reflect the consensus of the panel.

Guy King noted that the historical reconstruction methods used by his office are documented in Appendix A of the annual Trustees Reports. In response to a query by Dr. Newhouse, John Cookson stated that M&R intended to address those methods in its forthcoming report.

## 6. Geographic Issues

This portion of the agenda featured a presentation by Dr. Frank Porell of Brandeis University. Dr. Porell stated that the intent in defining disparate geographic units is to account for local variations in price and practice patterns. His group is currently looking at four alternatives to the current "county of residence" definition. Those alternatives are:

- a. The maximum boundary approach, in which cross-boundary differences in price and utilization patterns are as large as possible ("steps" rather than small changes).
- b. A "risk cell" approach, based on work by Schuttinga and Welch, in which urban core, suburban ring, metropolitan size, and rural classifications are taken into account.
- c. A hospital market area approach, in which patient origin patterns are examined and areas are grouped based on the hospitals they use.
- d. An HMO-specific market area approach, which would involve a separate regional adjustment for each separate HMO.

The advantages and disadvantages of these approaches, as currently perceived, were briefly discussed. None seems a clear favorite at the moment. Each involves the use of zip code (three-digit or five-digit), rather than county, as the basic building block.

The ensuing discussion went beyond the issue of pure geography to that of five-year averaging; several conferees wanted to know whether the process currently used fairly reflects the true experience of a given area. In particular, the impact of PPS on rural-urban cost differences was raised. Clifton Maze, sitting in for Guy King, noted that historical adjustments had been made to account for the PPS effect.

Commenting on the approaches outlined by Dr. Porell, Harry Sutton noted that the hospital market area approach suffered from the instability of hospital service areas, particularly in metropolitan areas.

Discussion of zip codes brought out the following:

- a. There are 42,000 five-digit zip codes in this country. Clearly, zip code cannot be "the" geographic unit; some form of aggregation and blending is required.
- b. According to Dr. Hornbrook, zip codes, unlike counties, can change. In one sense, however, this may be desirable since new zip codes reflect economic development.

Boundary crossings, a potential complicating factor, were discussed. Dr. Newhouse questioned whether there might not be more boundary crossings in HMOs than in the fee-for-service sector. Dr. Hornbrook stated that this was indeed the case at Kaiser Portland, where their specialized facilities were drawing suburban enrollees, but that the effect was marginal. Earl Whitney cited a counter-example, in which HMO enrollees in South Jersey were now using local (Jersey) hospitals rather than traveling, as in the past, to Philadelphia.

Mr. Whitney raised an interesting conceptual issue: is it desired that HMOs be able to operate profitably, under the AAPCC, in any part of the country or only in those areas where significant savings, relative to the fee-for-service sector, can be realized? Expanding on this point, Kathy Langwell noted that there are areas where an HMO cannot operate profitably at 95% (or even 100%) of the AAPCC. Karen Wintringham went further: there are some areas where "they just can't have HMOs at all". Dr. Gruenberg noted that a low AAPCC does not necessarily denote fee-for-service efficiency; it might simply reflect under-service to the population. Bringing in an HMO would open up services to the elderly and cause costs to rise. An HMO, however, would be reluctant to undertake such a contract given the unacceptably (and unrealistically) low rate of payment it would receive.

On the aggregation of zip codes, the notion of blending area means in order to produce more stable estimates found general favor; however, the specific mechanism for accomplishing this met with controversy. Dr. Manton favored the use of Stein shrinkage estimators. Dr. Welch disagreed, stating that

people would not understand the source of these numbers and their legitimacy. Concerned that the problem was perhaps being defined too narrowly and too technically, Dr. Welch stated his preference for a system which is "simple enough to administer, simple enough to understand, so that if HMOs are really a good thing they continue to grow." Dr. Manton responded by stating that shrinkage or blending models, once they have been used to help understand certain basic phenomena, can be transformed into precise geographic boundaries capable of being understood at an entirely different level. Dr. Newhouse endorsed the use of Stein estimators; the basic issue, however, remained unresolved.

On another front, Harry Sutton voiced concern that counts of the number of Medicaid and institutionalized Medicare beneficiaries, needed to develop the AAPCC, might not be accurate. Karen Wintringham shared his concern, noting that the HMOs themselves have difficulty counting the number of institutionalized persons within their own enrollment; i.e., unless the individual requires medical care, enrollees institutionalized in a non-HMO facility are invisible to the system.

Returning to the issue of temporal stability, Clifton Maze noted that five-year averaging tends to promote stability within geographic areas. Since any given year carries a weight of only one-fifth, changes from year to year are generally no more than a few percent in either direction. Earl Whitney agreed with this statement in principle but, citing a case in which a carrier was six months late in making payments, expressed concern that biases might nonetheless arise in certain areas. He suggested the panel consider the possibility of using six (rather than five) years of area-specific data, dropping both the high and low years.

## 7. Selection Issues

Dr. Manton of Duke University described a proposed study in which selected findings from a 1982-1984 long term care survey, involving a large sample of Medicare beneficiaries, will be correlated against the service use characteristics of those individuals based on claims files and other use data. The sample, in 1982, consisted of 36,000 beneficiaries, of whom 6,400 resided

in the community and had chronic disabilities (90 days or longer); an additional 2,000 were institutionalized. This left a large residual group of non-respondents and individuals who were neither living in institutions nor chronically disabled.

In 1984, an additional 5,000 people, having reached the age of 65, were added to the sample, producing a full cross-section of Medicare beneficiaries in that year as well. Dr. Manton stated that the purpose of the proposed study is to follow all of these people longitudinally for six years, making use of Part A (and to some extent, Part B) files which contain their service use history. Correlation of this information with the individual's functional, health, and social status at the two survey times, in addition to the usual demographics, is expected to provide useful covariate information with respect to morbidity and mortality among the elderly. Dr. Manton briefly outlined a number of ways in which this database might be used to investigate selection issues relating to HMO risk contracts. At the most basic level, the survey data will be used to provide updated underwriting weights for the current AAPCC demographic factors, including beneficiaries that are institutionalized.

Following Dr. Manton's talk, Arlene Ash of Boston University provided a second presentation on selection issues. Her talk, in which she was later joined by Randy Ellis, described a study, conducted by the Brandeis and Boston University Consortium, of a prior use model based on the notion of diagnostic cost groups (DCGs). The focus of the study was to see if hospitalization of an elderly patient in year  $x$  could serve as a marker for that individual's health care costs in year  $x+1$ . The study indicated that for certain diagnoses this was indeed the case. Reducing some 800 ICD-9 diagnostic codes to 78 diagnostic groups, the study team found that patients discharged in diagnostic group 618 ("genital prolapse") experienced an average cost, the following year, of only \$924; those in group 428 ("heart failure") experienced an average cost of \$4,438. The N's involved were significant: there were 313 in the former group and 1,750 in the latter.

By clustering in terms of "next year" costs, the study team reduced the 78 diagnostic groups to nine prediction groups, as follows:



<u>Prediction Group</u>	<u>Actual Health Care Costs NEXT Year</u>
1	\$ 924 - \$1,343
2	1,625 - 1,915
3	2,055 - 2,441
4	2,470 - 2,854
5	2,874 - 3,690
6	3,714 - 3,821
7	4,036 - 4,166
8	4,438 - 5,771
9	13,151

Additional clustering reduced the nine prediction groups to three diagnostic cost groups, as follows:

Low Cost Group: Prediction groups 1 through 3 plus those who were not hospitalized during the preceding year.

High Cost Group 1: Prediction groups 4 and 5.

High Cost Group 2: Prediction groups 6 through 8.

Prediction group 9, involving renal dialysis, was treated separately. As a further refinement, hospitalizations that were highly discretionary or related to extremely vague diagnoses were removed from the model.

Using these results as a starting point, the study team developed a proposed formula for capitation payments in the year following the hospitalization. Proposed payments for members of the Low Cost Group were distinctly below average while those for High Cost Groups 1 and 2 were distinctly above. The two high cost groups comprised, in the study year, slightly under half of the Medicare hospitalizations and about 9% of the population.

The goal of the model is equity and fairness: on average, the HMO receives the correct payment, but any incentive to "skim" is effectively removed. While the explanatory power of the model, as measured by  $R^2$ , is not overly

impressive (anywhere from 4.9 to 9.9 percent depending on how much Part B data is included), a relatively low  $R^2$  is perhaps to be expected since only 9% of the population are ultimately set apart as "different".

Commenting on  $R^2$ , Randy Ellis noted that the values achieved by the model compare favorably with the  $R^2$  of 2.6 percent which earlier work had indicated was possible using any hospital admission (regardless of diagnosis) as the measure of prior use. RAND's experience suggests that for a non-elderly population, 15 percent may be the best one could hope to accomplish based on individual values (age, sex, etc.) which do not vary over time.  $R^2$ , however, may not be the most relevant measure for expressing the value of the model; its major value lies not so much in its explanatory power as in its potential for discouraging favorable selection and for rewarding HMOs fairly in the event of adverse selection.

Members of the panel reacted favorably to the model, in one case suggesting it be put to an immediate demonstration. Others, however, raised some issues of practical concern:

- a. Karen Wintringham addressed the matter of data availability. Hospital discharge abstracts are ordinarily not available for enrollees hospitalized out of area or in an emergency. Although the record will eventually find its way to HCFA, that might be too late for inclusion in next year's projection. (The Consortium response: there's nothing magic about using last year's data; hospital stays that are two years old might be equally valid as markers.)
- b. Susan Palsbo raised two questions: (1) Can the model recognize and act on multiple diagnoses, and (2) How will the model handle people that have just turned 65, for whom prior data are lacking? (Response: With respect to co-morbidity, the Consortium's latest dataset includes provisions for up to five diagnoses. On the issue of persons turning 65, the Consortium plans to use two separate models -- one for those entering the system and one for ongoing members of the HMO.)

The panel's major concern centered on the issue of gameability: will HMOs be motivated to hospitalize patients who might otherwise be treated on an outpatient basis in order to qualify for higher payments next year? While some panel members felt this would not be the case, Dr. Ellis noted that one way currently being considered to help HMOs resist temptation would be to set a minimum threshold for length of stay; stays that are shorter would not increase next year's payment. Another suggestion voiced by several panelists was to permit outpatient treatment of certain discretionary diagnoses to qualify as a marker, thereby incentivizing HMOs to continue to exercise cost containment.

#### 8. General Issues

The final segment of today's meeting was devoted to a discussion of pending legislative proposals and their impact on the AAPCC.

No clear impact was seen in the event of passage of a catastrophic proposal. One panelist predicted that catastrophic provisions would, if anything, heighten the HMOs' concern that the AAPCC be accurate.

The prescription drug benefit was seen by some as a threat. Apart from being difficult to project, the feeling was that a drug benefit tends to attract people who are sicker than average.

Dr. Welch felt that a 12 month lock-in period, by preventing people from gaming the system and moving between HMOs, was a reasonable proposal. Others had reservations, one suggesting an initial lock-in period of six months, increasing after a period of stabilization to twelve.

The final item discussed was the timetable for the second panel meeting. A meeting date of Thursday, August 6, was agreed upon. At that time, the M&R report will be discussed. Panelists with additional comments or recommendations for additional study items should assure that this information reaches Marian Gornick no later than July 28 in order that it may be distributed to the panel, along with the M&R report, at least one week prior to August 6.

AAPCC STUDY PANEL  
MINUTES OF SECOND MEETING  
AUGUST 6, 1987

AAPCC Study Panel Meeting  
August 6, 1987  
The Rand Corporation  
2100 M Street, N.W.  
Washington, D.C.

MINUTES

1. The Chairman, Dr. Joseph Newhouse, introduced two new members of the Study Panel: Dr. Alain Enthoven of Stanford University and Dr. Frank Sloan of Vanderbilt University. All members of the panel with the exception of Dr. Ken Manton were present. Other attendees included Marian Gornick, James Lubitz, James Beebe, and Harry Savitt, all of the HCFA Office of Research and Demonstrations; Guy King, HCFA Chief Actuary; John Cookson of Milliman & Robertson, Inc.; Arlene Ash and Randall Ellis, Boston University; Marilyn Field and Abby Guttenberg, the Physician Payment Review Commission; and Leonard Greenberg, The Circle, Inc. Glenn Heckbarth, Deputy Administrator of HCFA, and Joseph Antos, Director of the Office of Research and Demonstrations, attended for part of the meeting.
2. The Chairman asked for comments on the minutes of the first meeting. Several minor changes were suggested and adopted.<sup>1</sup>
3. Two presentations were made. The first, by Kathryn Langwell, dealt with the issue of biased selection in Medicare competition demonstrations. Ms. Langwell reported that a study of 17,000 enrollees in 17 demonstration HMOs revealed use rates during the two years prior to enrollment that were significantly lower than those of a comparison group of 12,500 non-enrollees in the same market area, implying that the HMOs in question may be enjoying the benefits of favorable selection. Compounding the problem, enrollees who disenrolled in the first two years were found to have had significantly higher prior use rates than those who remained enrolled or who stayed until death. Both of these phenomena -- favorable selection and the bias toward disenrollment of sicker-than-average enrollees -- indicate the need for refining the AAPCC to assure that any savings achieved with respect to the fee-for-service sector are real. Beyond that, additional controls on disenrollment may be needed.

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<sup>1</sup> The revised version of the minutes appears in this appendix.

4. The second presentation, by Dr. Randall Ellis, featured additional results from the diagnostic cost group (DCG) study introduced at the previous meeting. Dr. Ellis, with the subsequent participation of Dr. Arlene Ash, reported on the ability of prior use data (in this case, 1984 hospitalizations grouped by DCG and coded according to degree of discretion) to "explain" variations in an individual's actual cost for 1985. Analysis of fee-for-service data for a 1% sample of Medicare beneficiaries resulted in the following  $R^2$  values:

<u>Explanatory Variables</u>	<u>Value of <math>R^2</math></u>
Demographics plus DCGs, no exclusions	.054
Demographics plus DCGs, excluding admissions that are highly discretionary	.038
Demographics plus DCGs, excluding admissions that are highly or moderately discretionary	.024
Demographics plus dummy variable if hospitalized at all	.038
Demographics only	.0076

The  $R^2$  values were placed in context by Drs. Ellis and Ash who reiterated that 14-15% is about the best one could hope to accomplish based on the use of individual values (age, sex, etc.) which do not vary over time.

Responding to a query on multiple hospitalizations, Drs. Ellis and Ash noted that a model which takes into account the actual number of hospitalizations does about as well as one based on DCGs with no exclusions ( $R^2 = .054$ ); however, such a model, in their judgment, provides perverse incentives and should be avoided. Their approach is to base the payment formula on the worst single hospitalization in a given year.

Other tables presented by Drs. Ellis and Ash included a comparison of the predictive ratios (predicted cost ÷ actual cost) achieved by each of the models described. Their future plans include expanding the study to a larger (5%) sample of Medicare beneficiaries, which would permit split sample comparisons and validation.

5. Marian Gornick noted that additional presentations, beyond those provided by Ms. Langwell and Drs. Ellis and Ash, had been contemplated but were decided against in order to permit the panel to focus on the Milliman and Robertson (M&R) report and to provide adequate time to develop specific recommendations. She suggested that panel members and other interested persons who wish to surface particular issues or concepts set their thoughts on paper for dissemination and discussion. She noted that three such papers were available for the present meeting:

- a. The first, by Dr. Leonard Gruenberg, discusses the higher treatment costs associated with the frail elderly and suggests that "frailty", suitably defined, be used as a health status adjustment factor.
- b. The second paper, by James Lubitz, discusses four HMO payment methods which have been proposed to counter the effects of biased selection. Two of those methods, discussed in the M&R report, are (1) a prior use model such as DCGs, and (2) reinsurance. Two other methods, independently suggested, are (3) a blend of capitation and fee-for-service payment proposed by Dr. Newhouse, and (4) an approach, proposed by Dr. Enthoven, in which certain high-cost procedures are excluded from the AAPCC and paid for, should they occur, on a prospective, DRG-like basis.
- c. The third paper, by James Beebe, outlines issues and criteria to be used by the Brandeis University study team in their work on geographic reconfiguration.

Each of the papers described was distributed for panel review and subsequent discussion.<sup>1</sup>

6. Following these preliminaries, discussion of the M&R report, initially led by Earl Whitney, began. Much of the discussion centered on the three major

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<sup>1</sup> These papers, plus two others distributed at the subsequent panel meeting, are included as appendices in the present report.

components of the AAPCC, as defined by Milliman and Robertson. Those components are:

- a. The USPCC
- b. Geographic adjustments
- c. Demographic factors

Ways of improving the calculation of each of these items were discussed. In addition, two topics of special importance to the AAPCC calculation were discussed:

- d. Geographic reconfiguration (is the county really the best choice of geographic unit?), and
- e. Biased selection (what can be done to counter the effects of favorable selection and biased disenrollment?).

Within each of these areas, problems as perceived by Milliman and Robertson and/or other members of the panel were identified; proposed solutions were presented and discussed. A synopsis of these problem areas and proposed solutions, structured to facilitate further deliberation and the reaching of explicit recommendations, is presented in Attachment I.

7. In discussing the M&R report, several panelists expressed concern regarding the "major purposes" listed for the AAPCC. Gordon Trapnell, among others, questioned the purposes pertaining to HMO growth and participation, contending that those purposes, however commendable they might be in another context, had no bearing on the mandate of this panel. Glenn Heckbarth, asked to provide guidance on the issue, confirmed that HCFA's policy is to create fair choice for beneficiaries and providers, not to promote a particular form of delivery. From that standpoint, the AAPCC should be linked, as at present, to fee-for-service costs. There are no imminent plans to cut the link between fee-for-service and Medicare capitation payments.



8. In closing the meeting, the Chairman summarized the day's proceedings as follows:

- a. DCGs. - No serious objections were raised with respect to the DCG approach. The only issue appears to be how best to refine and demonstrate it.
- b. Frail elderly. - A second possible adjustment factor, and perhaps one way of eliminating the institutional factor, is the frail elderly concept.
- c. Retrospective adjustment. - The issue of retrospective adjustment was discussed with no real consensus.
- d. High HMO penetration. - In estimating costs in areas with high HMO penetration, Dr. Welch's notion of basing the calculation on the rate of change in low penetration areas with similar characteristics seemed to find favor.
- e. Unmet need. - The answer to this issue would appear to lie in Glenn Heckbarth's comments on fair competition and choice.
- f. Geographic reconfiguration. - There appears to be some sentiment for larger aggregations, but some sentiment as well that it may not make any difference. The notion of shrinkage estimators, favored by Dr. Newhouse and others, was not really discussed but should be next time.

Other issues as yet unresolved include the VA/military hospital and Medigap factors, the use of five-year age breaks, and the notion of permitting HMOs to charge differential premiums. The full set of issues, with accompanying recommendations, will be addressed at next week's meeting in Santa Monica.

AAPCC STUDY PANEL  
MINUTES OF THIRD MEETING  
AUGUST 12-13, 1987

AAPCC Study Panel Meeting  
August 12-13, 1987  
The Rand Corporation  
1700 Main Street  
Santa Monica, California

MINUTES

1. All members of the Study Panel with the exception of Dr. Manton, Dr. Sloan, and Mr. Sutton were present. Other attendees included Joseph Antos, Marian Gornick, James Lubitz, James Beebe, Harry Savitt, and John Sirmon, of the HCFA Office of Research and Demonstrations; Guy King, HCFA Chief Actuary; Arlene Ash, Boston University Medical School; C. Richard Neu and Albert Williams, The Rand Corporation; Marilyn Field, the Physician Payment Review Commission; and Leonard Greenberg, The Circle, Inc.
2. The Chairman announced that the meeting would address, in order, each of the items outlined in the handout prepared by HCFA staff and The Circle,<sup>1</sup> plus any additional items raised during the course of discussion. He noted that the handout listed problem areas and proposed solutions, and that the panel's charter was to convert these, wherever possible, to precise recommendations.
3. Calculation of the USPCC

Retrospective adjustment. - The notion of retrospective adjustment, as a means of remedying errors in the USPCC, was decisively rejected. None of the panel members favored retrospective adjustment; most were opposed.

Prospective adjustment. - The possibility of future prospective adjustment, in the event the USPCC shows a consistent bias, was likewise rejected. Instead, the panel recommended that HCFA publish, each year, the assumptions and calculations that enter into the USPCC, allowing ample time for industry review and comment. In addition, prior year projections should be reconciled against actuals once these are known.

Timing of the USPCC calculation. - The panel's position was that basing the USPCC on a more recent reconstruction of claims, as suggested by M&R, would

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<sup>1</sup> See Attachment I, minutes of second meeting.

probably increase its accuracy, and that Mr. King and HCFA Administration should work out the details as to how this might best be accomplished.

#### 4. Geographic Adjustments

Expanding the time base. - The M&R report acknowledges that expanding the time base over which area averages are calculated, and discarding the high and low values, yields mixed results at best. The issue was dropped.

Other modifications to five-year averaging. - The panel agreed that M&R's suggestion of a regression approach with empirical weights on the years, and unequal weighting of counties, might yield improved results. HCFA should study the matter to see if it makes a difference.

Beneficiary migration ("snow birds"). - Beneficiaries who move between warm and cool climates may present a problem in terms of AAPCC calculation; their service costs are assigned to the county of residence at the time of service while their enrollment count is based on their county of residence as of July 1. The problem exists, however, only if the enrollee has notified HCFA of the change in residence. Enrollees who fail to advise HCFA of seasonal moves do not distort the AAPCC; both their costs and their count are charged to the same county. The magnitude of the problem is unknown at the present time and should, in the panel's view, be studied, with particular emphasis on those counties where it is likely to make a difference.

Yearly adjustment for demographics. - M&R's suggestion that the adjustment for area demographics be applied one year at a time, rather than once for all years combined, was approved.

Shrinkage estimators. - The use of shrinkage estimators to reduce area differences was deferred for later discussion, under geographic reconfiguration.

Areas of high HMO penetration. - M&R's suggestion that the calculation of fee-for-service costs in areas of high HMO penetration be based on a blend of (a) the USPPC increase, (b) cost trends in all high penetration areas

combined, and (c) trends in neighboring areas, was modified. Dr. Enthoven regarded the second item -- trends in all high penetration areas combined -- as inappropriate. Dr. Welch preferred a generalized national rate cell approach in which comparable areas of the same size are merged. He, along with others, suggested that the treatment of high penetration areas be structured to avoid sharp discontinuities over time; among other possibilities, he suggested the nation not be dichotomized into "high" and "low" penetration areas but that rate of penetration be treated as a continuous variable. Other discussion on the issue centered about the desirability of using rates of change versus absolute dollars as the basis for estimation. No clear consensus emerged.

VA/military hospital, unmet need, and Medigap issues. - These issues have in common the following: each contributes to a potential understatement of the costs HMOs are likely to incur in a given area; that is to say, the fee-for-service costs currently borne by Medicare may not be an adequate reflection of the costs an HMO would be likely to bear. Dr. Enthoven suggested several ways of handling portions of the problem, e.g., eliminating VA eligibles and DOD retirees and their dependents from the AAPCC calculation, providing supplemental payments to HMOs in areas that are demonstrably underserved, etc. The general feeling of the panel, however, was that there is insufficient information and prior research on these issues to justify any conclusions at this time.

Working aged. - The working aged are a special case of the above, i.e., the AAPCC is systematically reduced by the percentage of working aged in the area population. (If covered by employer health insurance, they contribute zero -- or minimal -- cost to the numerator while counting fully in the denominator.) Commenting on M&R's suggestion that a separate demographic category be created for these individuals, Mr. King stated that his office had originally considered such a possibility but had rejected it because of data problems and other difficulties. Dr. Luft suggested the possibility of using Social Security data to identify the number of working aged in a given area, for exclusion from the denominator. Mr. Trapnell noted, however, that not all employed persons are necessarily covered by employer health insurance. Again, no conclusion was reached.

## 5. Geographic Reconfiguration

The Chairman introduced a memorandum from Dr. Luft<sup>1</sup> in which he defined a possible approach for improving the geographic "unit". Starting with a county base, he suggested moving zip codes from one county to another to form more homogeneous (low coefficient of variation) groupings with respect to the variable "fee-for-service per capita cost". The clusters thus developed would then be used for AAPCC computations.

Dr. Enthoven expressed preference for the core-ring concept previously presented by Dr. Welch, noting that any differences between core and ring payments should be related more to factor costs than to fee-for-service utilization. He also felt it was important to use the same geographic unit for all three major payment systems: PPS payments to hospitals, Part B payments to physicians, and capitation payments to HMOs.

Dr. Luft noted that depending on how ring and core are defined, his approach might not be inconsistent. Dr. Welch, however, identified the following fundamental difference: the distinction between ring and core is governed by the Census Bureau's definition of an urbanized area -- 1,000 persons per square mile -- while Dr. Luft's approach is based on cost. Another advantage, in Dr. Welch's opinion, of the core-ring approach is its understandability and simplicity, important factors in gaining HMO acceptance.

No clear consensus emerged from the ensuing discussion; panel opinion was divided. While both approaches were recognized to have merit, concern was expressed as to how to define, under Dr. Luft's approach, the appropriate number of clusters for a given larger geographic area; the possibility of a high degree of gerrymandering was also raised. The core-ring approach, on the other hand, was also recognized as arbitrary in its use of the 1,000 person per square mile threshold. The need for developing both approaches, and for integrating the Luft approach with the reconfiguration study being conducted by Brandeis University, was recognized.

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<sup>1</sup> See Appendix F.

Dr. Luft suggested a possible test of the two models: divide an MSA into two clusters using his approach versus the core-ring approach, to see what the differences in output are and which makes more sense. He also stated that the number of clusters in a given MSA need not be restricted to two, that the number should be related to the total population size.

At this point, the Chairman raised the issue of using shrinkage estimators to reduce, to the extent appropriate, inter-area variability. Under this approach, smaller clusters whose estimated per capita costs might be distant from the mean because of sampling variance, are brought into a greater state of conformity using formulas which have by now been generally accepted. While no explicit vote was taken, there appeared to be a general consensus that some form of blending or shrinkage estimator might be desirable.

The Chairman summarized his sense of the panel's feelings as follows:

- a. For MSAs, five-digit zip codes should be aggregated into some actuarially appropriate (to be defined) number of clusters, the number of clusters being roughly proportional to the population.
- b. For rural areas, a similar approach should be applied using three-digit zip codes.
- c. HCFA should study the impact of shrinking these local estimates toward some larger, possibly state or national, mean.

#### 6. Biased Selection

Methods for counteracting the effects of biased selection were discussed under three headings:

- a. Health status adjustments
- b. Financial and other disincentives
- c. Blends of capitation payment with methods for recognizing current use.

a. Health Status Adjustments

The Chairman noted that the leading contender in this area is the DCG model, discussed at the first two panel meetings. A new candidate, however, was offered by Dr. Gruenberg -- the frail elderly. Dr. Newhouse stated that the issue the panel must face was whether to do something now or to await further development of these approaches.

Dr. Welch, among others, voiced strong support for the DCG model, provided it is structured to combat gaming. Dr. Hornbrook suggested the possibility of widening the prior use window to two or three years, to get at diseases that might skip a year but are still present and are being treated on an outpatient basis. Dr. Gruenberg agreed with Dr. Hornbrook in concept but expressed concern that widening the window might increase the gaming problem.

Guy King argued that the presence of a health status adjustment factor, even one with a fairly decent  $R^2$ , provides no guarantee that gaming will not take place. If the factor isn't "right", HMOs may manage to enroll those among the high cost group that are not really high-cost, while encouraging the disenrollment of those that are. Cautioning that his remarks were not intended to argue against health status adjustment but rather to urge that it be done right, Mr. King noted that HMOs stand to make a greater profit from the selection process when there is a health status adjustment factor than when there is none.

Mr. King's comments triggered discussion of the steps that can be taken to minimize the gains an HMO could make through favorable selection. A key point, raised by Dr. Gruenberg, is that  $R^2$ , the generally accepted criterion for judging the suitability of health status adjustment factors, is operative only when enrollees are randomly selected. When there is another factor involved, which permits HMOs to distinguish between the truly high and truly low cost persons in a given cell, the usefulness of  $R^2$  is diminished. Dr. Ash acknowledged the point, stating that the answer is to identify that other factor, thereby creating two cells where there previously was one.



Other positions on the subject of gaming were expressed by Mark Hornbrook and Karen Wintringham. Dr. Hornbrook stated that the tendency of physicians to want to treat interesting cases was a countervailing incentive to the disenrollment of "complex" patients. Ms. Wintringham noted that under a DCG system, the few HMOs that might be tempted to game would find it harder to do so without creating a public outcry or other adverse effect.

Dr. Enthoven echoed these sentiments, suggesting that the panel may be striving for perfection when progress is all that is needed. His feeling was that the DCG approach should be turned into a demonstration within a reasonably short period of time. Dr. Ash and others strongly recommended that in any such demonstration, HCFA should monitor disenrollees, the reasons they left, and their subsequent treatment history.

Dr. Gruenberg suggested that in any pursuit of DCGs, the frail elderly factor not be overlooked. Fifteen years of studying elderly utilization patterns have convinced him that functional status is the critical element in the diagnosis and treatment of multiply chronically ill elderly persons. Unless this element is part of the system, HMOs will be unwilling and unable to provide the services these people need. Support for Dr. Gruenberg's position was provided by Gordon Trapnell, who agreed that health care needs and utilization levels among the elderly may well be better explained by functional status than by DCGs. The panel's major reservation with respect to the frail elderly approach seemed to be its apparent susceptibility to gaming. Mr. Lubitz confirmed that HCFA administration shared this feeling and that the use of functional status as an adjustor had for some time been discouraged. Others on the panel disagreed with this position. Dr. Luft in particular noted that the frail elderly tend largely not to be found in HMOs, driving up the fee-for-service costs and therefore the AAPCC. One way of correcting the situation, according to Dr. Luft, would be to explicitly acknowledge their existence in the form of a health status adjustor. Attempts to game the system could be monitored through sample audits of enrollees with appropriate penalties for misrepresentation.

Responding to the preceding comments, Guy King noted that implementation of the frail elderly approach would require a functional assessment of

all 31 million Medicare beneficiaries. Relying on a survey to assess ADL limitations would, in Mr. King's judgment, result in serious undercounting. Perhaps the most important negative, however, is the following: Medicare isn't really oriented toward providing the services the frail elderly need.

Returning to the subject of DCGs, the Chairman noted strong panel support for early demonstration of the DCG model. Other comments on a possible DCG demonstration project included the following:

- (1) Kathryn Langwell recommended that any added administrative burden (additional data requirements, etc.) be carefully monitored.
- (2) Susan Palsbo noted that HCFA's ability to conduct a demonstration was effectively limited by a bill currently before Congress. The bill, currently in budget reconciliation, would prohibit HCFA from conducting any capitation demonstration projects involving more than \$15 million in Medicare funds unless Congress specifically authorized each such demonstration by statute.

Commenting on the proposed legislation, Dr. Antos noted that it in effect kills any possibility of a demonstration. He recommended the legislation be modified -- particularly in light of the OBRA mandate to study possible refinements to the AAPCC -- to permit HMO capitation demonstrations. The panel unanimously endorsed Dr. Antos' position.

Continuing the discussion of DCGs, Dr. Ash provided a summary of where the project is heading. By the end of the summer, they will have completed recalculation of the payment formulas based on 1984-1985 data. By that time, they will have received a 5% sample of 1984 data for validation purposes. Some regrouping of diagnoses is expected to take place. Additionally, they will examine several of the issues raised at this meeting, in particular Mr. King's conjecture concerning the existence of low-cost subgroups within high-cost cells.

Further thoughts on the need for additional research were voiced by several panelists, particularly Gordon Trapnell and Leonard Gruenberg. Mr. Trapnell

would like to see the DCG concept expanded beyond nine tiers, with procedures incorporated as well as diagnoses. Dr. Gruenberg emphasized the need for strong central direction and integrated planning. Several panel members stressed the need for conducting demonstrations in a variety of HMO settings to permit evaluating a range of problems. The desirability of a phase-in over several years, to minimize the impact on HMO revenues, was also noted.

b. Financial and Other Disincentives

Several approaches for discouraging biased disenrollment were discussed. Those receiving greatest attention were:

- (1) Holding HMOs responsible for the fee-for-service costs of disenrollees. Under this approach, HMOs would continue to receive capitation payments for individuals who disenrolled and would remain financially at risk for their health care costs for a specified period thereafter.
- (2) Regulatory monitoring of disenrollment to assure no abuses.
- (3) Mandatory lock-in following an initial trial period. Under a version offered by Dr. Luft, enrollees could disenroll only during the first three months, during which the HMO would receive no DCG adjustment (classic AAPCC). Thereafter, enrollees who chose to stay would be locked in for the full year, with DCG adjustment.

The notion of holding HMOs responsible for the fee-for-service costs of disenrollees was rejected on the grounds of likely industry resistance. Regulatory monitoring was favored with some dissent. Guy King, for example, stated that without specific sanctions for specific acts, HCFA's ability to guard against biased disenrollment would be limited. Karen Wintringham noted, however, that monitoring activities of this nature were nothing new: HCFA regional offices and state regulatory agencies do it every day.

The proposal for mandatory lock-in following an initial trial period was rejected. Some panelists felt it was politically infeasible; others felt it needed further study.

#### 6. Blended Approaches

Three approaches for dampening the financial effects of biased selection by blending capitation payment with methods for recognizing current use, have been proposed. They are:

- (1) Reinsurance (suggested by M&R)
- (2) A blend of capitation and fee-for-service payment, proposed by Dr. Newhouse
- (3) An approach, proposed by Dr. Enthoven, in which certain high-cost procedures are excluded from the AAPCC and paid for, should they occur, on a prospective, DRG-like basis.

The HMO industry representatives on the panel felt that these approaches addressed the small numbers problem rather than that of biased selection. Dr. Hornbrook stated that the way to deal with biased selection is through an appropriate risk adjustment model, leaving the HMO with the full risk. Ms. Wintringham noted that she would rather have the industry come up with its own protective mechanism, spread across several parties, than have the government do it for them. Ms. Palsbo reported that she had polled several GHAA members, involving staff, group, and IPA models, and that all agreed these proposals were "a step back". Plans with more than 10,000 Medicare enrollees felt they could self-insure; those with fewer than 10,000 needed reinsurance but would rather handle it themselves.

Others on the panel -- primarily the researchers -- saw things differently. Considerable discussion ensued but did nothing to change the perceptions of either group. The Chairman was obliged to acknowledge that closure could not be reached.

#### 7. Demographic Factors

Medically indigent. - Owing to the lack of data as to the existence of a problem, closure could not be reached on M&R's recommendation to distinguish

the medically indigent from other Medicaid eligibles. Another consideration is that not all states have a medically indigent category; nineteen do not. The panel recommended that the problem -- if there is one -- be studied.

Normalizing demographic factors. - The fact that the demographic factors, weighted by the population, do not sum to 1.0 is of no consequence from a computational standpoint. It does, however, raise problems in terms of public perception. From that standpoint, the panel recommended the factors be normalized, for the United States as a whole, each year.

Five-year age breaks. - The suggestion that the current five-year age breaks be smoothed to reduce discontinuities received a mixed reaction. There is no indication that this is in any way a problem, nor is it clear that smoothing is necessarily appropriate -- there may be blips. The panel felt that some form of smoothing, or adjustment, might improve things but was uncertain as to whether the added complexity was worth any benefits that might be derived.

Institutional factor. - There are two major aspects to this problem. The first is the perverse incentive that the use of an institutional factor represents. The second is the difficulty in obtaining accurate institutional counts.

A memorandum addressing these and related issues was prepared by Karen Wintringham.<sup>1</sup> Ms. Wintringham proposed, in essence, that HCFA (1) disclose the basis on which its adjustments are made, (2) develop reporting alternatives that would make the process less burdensome for HMOs, and (3) develop an alternative mechanism, such as the frailty index, which could serve to replace the institutional factor.

Formerly disabled persons. - M&R's recommendation that a separate rate adjustment be provided for persons formerly disabled was tabled pending the outcome of the Duke University study which addresses this issue.

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<sup>1</sup> See Appendix G.

## 8. Other Issues

The following additional topics were discussed:

- a. Distortion of the USPCC -- As biased selection takes place [as greater numbers of healthier-than-average individuals leave the fee-for-service sector for HMOs], the USPCC tends to increase.
- b. Supplemental premiums -- Should HMOs be allowed to charge whatever it takes to underwrite anticipated losses? Should premiums vary by county?

On the first of these issues, Dr. Newhouse proposed that calculation of the USPCC be based on a standardized population, invariant over time. At the outset, the population would be described in terms of age, sex, and welfare status. As DCGs or other adjustors become operational, they would be added as well.

A related recommendation, advanced by Dr. Luft, was that HCFA study the impact of HMO penetration on fee-for-service costs, by comparing the year-to-year growth in USPCC with the corresponding growth in the AAPCC in areas with varying degrees of HMO penetration. Both Dr. Luft's recommendation and Dr. Newhouse's were supported by the panel.

On the second issue, several panelists initially expressed concern as to the impact if supplemental premiums were to be allowed on basic benefits. There was general recognition, however, that circumstances could exist in which an additional premium might be justified and not a subterfuge to cover inefficient operation. Given the existence of competition in an area, no reason was seen for denying HMOs this right. The definition of what constitutes "competition" remains to be determined but could be defined as the existence of at least one other HMO.

Prior to adjournment, Susan Palsbo requested that HCFA review its total data system, both fee-for-service and HMO, and that it evaluate its existing data collection requirements and capabilities in the light of future needs.

A C R

MEDICARE TEFRA RISK CONTRACTING:  
A STUDY OF THE ADJUSTED COMMUNITY RATE (ACR)

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## EXECUTIVE SUMMARY

### MEDICARE TEFRA RISK CONTRACTING: A STUDY OF THE ADJUSTED COMMUNITY RATE (ACR)

This report presents an assessment of the "adjusted community rate" (ACR) requirement for HMOs and CMPs with Medicare TEFRA risk contracts. The ACR serves as a prospective regulatory device to constrain Medicare profit rates to be equivalent to that earned by HMOs in their commercial business. An HMO must project its revenue requirements for serving Medicare enrollees, using as a base its community rate or average commercial premium. Adjustments made to this rate reflecting the higher expected utilization and service intensity of the Medicare population yield the ACR. When projected AAPCC capitation payments exceed the ACR, an HMO must either return this difference to the government or pass it on to Medicare enrollees in the form of enhanced benefits and/or reduced premiums.

This study's goal has been to evaluate the current ACR methodology and the impacts of the ACR requirement, to determine whether the ACR requirement itself is conceptually appropriate and necessary, and to explore alternative policy options.

We interviewed individuals from TEFRA HMOs, actuarial consulting firms, HCFA's Office of Financial Management (OFM) of the Office of Prepaid Health Care (OPHC), and national HMO trade organizations. We also conducted our own review of ACR proposals, and some limited descriptive analysis of ACR summary data. We summarize our findings below.

#### Assessment of the ACR: Administrative Aspects

While ACR projections may not have sufficient precision for distinguishing small differences in the Medicare revenue requirements among plans, the accuracy of the methodology is sufficient for distinguishing situations where AAPCC payments significantly exceed expected HMO costs. Since HMOs use similar data for their internal prospective budgets and ACR proposals, the ACR can be characterized as a minor nuisance to plans. The effectiveness of the ACR as a regulatory tool appears to be hampered by administrative problems, including the peaking of ACR review activity at the calendar year's end. There are a number of procedural changes which would make the ACR application and review process more efficient and systematic for HCFA and, in some cases, more flexible for HMOs.

#### Assessment of the ACR: Policy Aspects

The ACR has played a relatively minor role in TEFRA risk contracts with HMOs, particularly compared to AAPCC payment levels. In terms of the two original ACR purposes -- constraining HMOs' Medicare profit rates and distributing excess profits to beneficiaries -- the ACR appears to have no impact. Instead, competitive factors in a plan's marketplace largely are responsible for ensuring that an HMO's potential Medicare profits are used to reduce enrollee cost-sharing and enhance the benefit package. It turns out, however, that the ACR serves the function of increasing HMO financial and utilization accountability.

### Policy Options and Recommendations

We propose four policy options for consideration:

1. Eliminate any requirement for prospective rate determination, and monitor HMO performance through retrospective review of utilization and financial performance.
2. Require HMOs to submit prospective budgets, in place of the current ACR application.
3. Maintain HCFA's current ACR methodology.
4. Modify the ACR requirement so as to make projections more precise.

In order to make a completely informed choice among these options, it is necessary for HCFA's regulatory goals toward Medicare HMOs to be made more explicit and to have more information on the ACR's accuracy, distribution of HMO Medicare profits and possible favorable selection of beneficiaries.

Option 1 could be used by HCFA to identify plans that appear to be outliers for the purpose of further scrutiny in terms of profit levels, marketing, quality and compliance. Options 2 through 4 represent prospective rate determination requirements. The relative advantages of Options 2-4 hinge on the relative value of precision in the estimates of revenue requirements and profits versus administrative burden to both HMOs and HCFA.

HCFA should continue to maintain mechanisms for monitoring the actuarial and behavioral aspects of the TEFRA program. The ACR performance to date, based on interviews and limited data analysis, suggests that the ACR type of regulation is not the best method for achieving these objectives.

We recommend further studies to:

- o determine whether in fact profit rated for HMOs under Medicare exceed those under their commercial lines of business (Some limited insights may be gotten from formal evaluations of the Medicare Competition Demonstrations and the TEFRA risk program.); and to
- o verify the existence and accuracy of data necessary to derive and support HMO ACR applications. (GAO expects to report their findings this year for a sample of four TEFRA HMOs.)

On the basis of our findings, we recommend that:

- o HCFA require TEFRA HMOs to submit actual utilization and cost data for Medicare beneficiaries (Option 1); but that
- o HCFA maintain the current ACR requirement until a system is in place to review revised HMO data reporting and to investigate plans with unusually high levels of utilization and cost.

MEDICARE TEFRA RISK CONTRACTING:  
A STUDY OF THE ADJUSTED COMMUNITY RATE (ACR)

I. INTRODUCTION

I.A Purpose and Scope of the Report

This study, performed under a cooperative agreement with the U.S. Health Care Financing Administration (HCFA), provides information for HCFA's recommendations to Congress mandated by section 9312(g) of the Omnibus Budget Reconciliation Act of 1986 [OBRA, 1986]. The purpose of the study is to evaluate the "adjusted community rate" (ACR) required by the Tax Equity and Fiscal Responsibility Act (TEFRA) of 1982 of health maintenance organizations (HMOs) and Competitive Medical Plans (CMPs) with Medicare risk contracts [TEFRA 1982, section 114(a)].

This study was conducted by the Bigel Institute for Health Policy of Brandeis University for HCFA as a function of its service as a HCFA Research Center. Funded through the Cooperative Research or Demonstration Project Provisions of Section 1110 of the Social Security Act, HCFA Research Centers work cooperatively with HCFA staff in the study of health care issues by general provision of technical assistance and actual preparation of reports and issue papers.

The purpose of this study is to provide information from which to evaluate whether the ACR requirement for HMOs and CMPs (hereafter, referred to as "HMOs," unless indicated otherwise) with TEFRA risk contracts is serving its intended public purpose. The goal of this study has been to address several fundamental issues about the ACR:



- o determining whether the ACR requirement itself is conceptually appropriate and necessary;
- o understanding the extent to which the current ACR methodology actually fulfills the purposes underlying the ACR concept, and the impacts the ACR requirement has had on HMOs and their functioning in the Medicare marketplace;
- o assessing whether the ACR methodology can be improved through modifications, or whether its purposes may be met through alternative regulatory means.

The remainder of this introduction is devoted to a formal presentation of hypotheses to be tested, the study research design, and a description of the overall organization of the remaining major sections of the report.

#### I.B Hypotheses to be Tested through the Study

The primary objective of this study was to test whether the ACR requirement has fulfilled its major purposes as intended in legislation, namely the limitation and distribution of HMO profits in excess of those earned by HMOs in commercial markets. In this section we summarize the major hypotheses tested in this study. Following the conventional approach taken in program evaluation, we advance a set of null hypotheses based on the premise that the ACR has not met its goals. In other words, we assume that the ACR has had no regulatory impact. Rejection of these null hypotheses requires that evidence be acquired to substantiate that the ACR has fulfilled its major purposes.

One broad null hypothesis concerning the goals of the ACR may be stated as follows:

- H1: The ACR requirement has not constrained Medicare profit per enrollee in TEFRA HMOs so as not to exceed profit rates reflected in their commercial premiums.

Due to constraints on this study, actual testing of this hypothesis requires that a series of sub-hypotheses be formulated and tested. The ACR may fail to meet its intended goals for a variety of reasons. The ACR methodology may yield inaccurate projections of Medicare revenue requirements because of the uncertainty associated with any projection into the future and the randomness in individual behavior. Potential error may also arise from inadequate data that are used in the methodology. Furthermore, the methodology itself may be poorly specified and regulated such that projections may be easily manipulable to the benefit of HMOs. Accordingly, we have advanced the following set of additional null hypotheses associated with the limitation of HMO profits expressed in H1 above:

- H1.1: The ACR methodology does not yield reliable and valid projections of HMO revenue requirements for serving Medicare enrollees.
- H1.2: TEFRA HMOs face excessive burdens in providing the necessary data for accurate ACR projections.
- H1.3: There is insufficient specificity in the ACR methodology and inadequate regulatory enforcement to ensure that the goals of the ACR are being fulfilled through its implementation.

The second stated goal of the ACR pertains to distribution of excessive Medicare profits. Our formal statement of a general null hypothesis is:

- H2: The ACR requirement has not forced HMOs to distribute revenue from excessive Medicare profit rates by passing them on to beneficiaries in the form of lower premiums, enhanced benefits, or returning the excess to the government.

The distribution of revenue resulting from excessive Medicare profit rates is obviously entangled with the limitation of profit

rates. If the ACR methodology is inadequate to ensure identification of excess profits, there can be no assurance that they are properly distributed. Even if the methodology yields accurate predictions, it is important to assess whether the ACR has influenced HMO premiums and benefit offerings since competitive market forces are likely play an important role here. We advance the following null hypotheses concerning the impact of the ACR on HMO premiums and benefit offerings reflected in the hypothesis H2 above:

H2.1: The ACR requirement has not constrained plans by forcing them to offer lower premiums and/or more generous benefits than otherwise would be dictated by competitive market forces.

A third general null hypothesis advanced in this study pertains to the fundamental purpose underlying the two major purposes of the ACR. In order to properly evaluate the ACR we believe it is important to distinguish flaws that may exist in the existing methodology or its implementation, from potential shortcomings in the concept itself. This amounts to addressing the propriety of the regulatory role of the government in limiting HMO profits. Accordingly, a third general null hypothesis advanced may be formally stated as follows:

H3: The current ACR regulation does not contribute toward the federal government's broad goals of safeguarding the public interests of the Medicare program and its beneficiaries.

The next section summarizes the research approach taken to test these null hypotheses.

## I.C Study Design

Our evaluation of the ACR process and methodology is based on information acquired through interviews, our own reviews of a sample of actual ACR proposals submitted in the last two years, and some limited descriptive quantitative analysis of summary ACR data provided by HCFA's Office of Prepaid Health Care (Appendix A). In total we interviewed individuals from 18 HMOs, 5 actuarial firms, 7 staff members from the Office of Financial Management in HCFA's Office of Prepaid Health Care, as well as several individuals from national HMO trade organizations. Given that the actuarial consultants interviewed were involved in the preparation of ACR proposals for a large number of HMOs not included in our study, these interviews add breadth to our study that is not reflected in the limited number of HMOs actually interviewed. These interviews were either conducted on-site or by telephone. The HMO interview protocol is contained in Appendix B.

Subject to the time and budget constraints placed upon this study, we interviewed a representative sample of 18 HMOs in terms of the number of TEFRA risk HMOs serving the same geographic market, HMO model type, geographic region, profit status, and chain membership. The sample of study sites was biased, however, toward HMOs with previous Medicare HMO demonstration experience and/or HMOs with longer tenure in the TEFRA risk program. Longer tenured HMOs could not only provide information on their earlier experience as new plans, but also their inclusion allows for a better assessment of how well the ACR methodology might work as the TEFRA program matures. Specifically, seven of the 18 study plans were demonstration sites prior to becoming TEFRA risk HMOs. Ten

study HMOs had submitted three ACR proposals as of 1987. In addition, our interviews with actuarial consultants provided further insights into issues of newer plans.

Fourteen of our study HMOs were located in three geographic markets with 3 or more TEFRA HMOs. The remaining four HMOs were located in either single TEFRA HMO markets, or markets with only one competing TEFRA risk HMO. The three multiple TEFRA HMO markets were chosen to reflect varied market conditions as reflected in prevailing Medicare HMO premium levels and benefit package offerings. In contrast to the other two market areas, zero Medicare premiums were the rule in one of the geographic markets studied. In one study market significant premium increases were observed for virtually all TEFRA risk HMOs in 1987 over the prior year.

A major limitation of this study is the lack of data on actual HMO Medicare costs. Without access to such data it is impossible to truly verify the accuracy or validity of the ACR methodology. Our assessments about the ACR methodology are thus limited to observations drawn from interviews and our own review of ACR data.

#### I.D Organization of the Report

Section II of this report contains background information about the purpose and history of the ACR, the ACR methodology, and the ACR regulatory process. Section III contains our findings concerning administrative aspects of the ACR, including an assessment of the accuracy of the ACR methodology, data burdens on HMOs, and the ACR review process. Section IV contains study findings concerning policy

aspects of the ACR, and in particular its performance in limiting HMO Medicare profits and the distribution of excessive profits to Medicare beneficiaries. Section V of the report contains our conclusions, recommendations for improving the current ACR, and discussion and recommendations associated with broader issues pertaining to alternatives to the existing ACR process and methodology.

## II. BACKGROUND OF THE ACR

The ACR is the community (average commercial) premium an HMO would charge for Medicare's standard benefit package adjusted for utilization differences between commercial and Medicare enrollees. In other words, the ACR is a form of HMO experience rating for Medicare basic services for Medicare enrollees. The ACR process refers to the submission of an HMO's proposed Medicare rate development application, including the benefit package and beneficiary premium, for HCFA approval.

This section includes background aspects of both the ACR and the ACR process. First, the purpose and history of the ACR are recounted. Second, the method by which an HMO is supposed to calculate its ACR, benefit package and beneficiary premium are delineated. Next, the sequence of events in which HCFA reviews plans' ACR submissions is described. And finally, the current status of the TEFRA program is described.

### II.A History and Purpose of the ACR

The historical roots of limiting HMOs' profits under Medicare go back to the 1972 Amendments to the Social Security Act, which was the first time plans were provided the opportunity for Medicare risk reimbursement. According to this legislation, an HMO would be at full risk for losses. However, if an HMO's actual Medicare costs were less than the AAPCC, the plan could retain 50 percent of its "savings" up to a maximum of 10 percent of the AAPCC. This asymmetric treatment of savings and losses resulted from strong concerns that HMOs would

experience windfall profits and encourage under-utilization (Triegeer, Galblum and Riley (1981), Iglehart (1985)).

The concept of the ACR became operational in the early Medicare HMO risk demonstrations of 1980-1981. A major purpose of the demonstrations was to test three prospective reimbursement systems: (1) payments at a percentage of the AAPCC, (2) payments based upon an ACR reflecting Medicare revenue requirements, and (3) payments based upon an actuarial projection of Medicare revenue requirements (Triegeer, Galblum and Riley 1981).

The actuarial method was never tested on plans to be paid on this basis because their revenue requirement projections exceeded their AAPCC. Nonetheless, the demonstration experience provided a basis for the adoption, by TEFRA, of an HMO capitation formula which incorporated both the rate book capitation (95 percent of the AAPCC) and the ACR. Regulations implementing TEFRA's ACR requirements were published in January 1985 (HCFA 1985).

While TEFRA's "legislative intent" is not explicit, the legislation and final regulations permitting risk contracts with HMOs includes safeguards to both the integrity of the Medicare program and the interests of beneficiaries. The major purposes of the ACR appear to include:

1. For the Medicare program, limiting HMOs' Medicare profits to the level of plans' projected commercial profit rate; and
2. For beneficiaries, ensuring that they receive value, including HMOs' distribution of Medicare profit rates in excess of commercial rates ("excessive profits") in the form of reduced premiums, reduced co-insurance and/or enhanced benefits.



## II.A.1 ACR as a Safeguard for Medicare

Using the ACR as a commercial-based HMO profit constraint has two elements: that it is a profit constraint and that it is commercially based. A major reason for constraining HMO profits is to reduce the likelihood of large windfall or unearned profits at Medicare's expense.

One source for windfall profits is that the AAPCC is fee-for-service (FFS) based. Historically regional variation in utilization rates is likely to be significantly greater among FFS providers than among HMOs, in large part because FFS providers are more insulated from competition than are HMOs. In response to competitive pressures, HMOs have reduced hospital utilization in areas with high FFS rates by up to 40 percent (Luft 1981). Furthermore, HMO utilization may be higher in certain areas where access problems may lead to low FFS utilization. As a result, the relationship between the AAPCC and HMOs' actual costs of providing Medicare benefits could vary substantially.

A second potential source of HMO windfall profits is the possibility of plans obtaining a favorable risk selection of Medicare beneficiaries at Medicare's expense. This may involve, for example, an enrollment where chronically ill beneficiaries are under-represented. Basing the ACR's premium on the plan's historical utilization experience limits plans' benefits from favorable selection. Another undesirable source of HMO profit is under-service of Medicare enrollees.

In the cases of favorable selection and under-service, limiting excess profits is advantageous to Medicare because the savings relative to AAPCC payments are artificial and actually reflect benefit value

losses to Medicare. Moreover, a profit cap reduces the incentive for an HMO to engage in such undesirable behaviors.

Higher HMO profits that result from higher FFS regional costs are not necessarily bad, for these rewards could help to change liberal practice patterns in high cost areas through greater HMO penetration in Medicare markets. On the other hand, legislators did not want HMOs to reap Medicare profits at greater than the commercial rate. For this reason, under TEFRA, HMOs are permitted to earn profit levels up to what would be projected for their commercial accounts; any additional profits are considered excessive. Moreover, linking HMOs' ACR to their commercial premiums had the explicit purpose of having commercial insurance markets serve as proxies for competitive outcomes under Medicare (Ginsburg and Hackbarth, 1987).

The most explicit enforcement of the HMO profit constraint is for a plan to accept lower payments from HCFA. And if payments to an HMO exceed its ACR, that in fact is one of plans' options for distributing excessive profits under TEFRA.

#### II.A.2 ACR as a Safeguard for Medicare Beneficiaries

From the perspective of Medicare beneficiaries, their benefit value can be protected by the ACR. The HMO's premium "for basic Medicare benefits plus the actuarial value of its cost sharing cannot exceed the actuarial value of the cost sharing its enrollees would have incurred had they remained in traditional Medicare" (Ginsburg and Hackbarth 1987). The concept of value also extends to the premium a plan charges for supplemental benefits.

To ensure beneficiary value, HMOs have three options concerning the distribution of excessive profits: 1) subsidization of Medicare premiums or coinsurance, 2) supplementation of benefits, and/or 3) contribution to a benefit stabilization fund to help dampen the effect of year-to-year AAPCC variations on these subsidies. The apparent legislative intent behind these distributions is that beneficiaries should benefit from HMOs' excessive profits.

In summary, the purposes of the ACR follows the historical tradition of Medicare risk contracting with HMOs. The government needs to be protected from HMOs' reaping excessive profits and beneficiaries need to be ensured that they receive their full value from their HMOs.

#### II.B HCFA's Standard ACR Methodology

HCFA's standard ACR methodology is an approach for projecting total revenue requirements of an HMO for provision of the standard Medicare package to Medicare beneficiaries, the dollar values of additional benefits offered to Medicare enrollees, and the premiums charged to enrollees. The standard ACR methodology is comprised of seven major components:

1. The base rate of the ACR is the benchmark of the methodology. It is the allocation of the average premium the HMO charges to its commercial enrollees to medical service and administrative categories. It is exogenous to the ACR projections in the sense that it is fixed through commercial premium development.

2. The initial rate of the ACR is the projected estimate by Medicare service categories of the amount an HMO would charge its commercial enrollees for the standard Medicare benefit package. The HMO's base rate must be adjusted to reflect only those benefits contained in the standard Medicare package of benefits. The initial rate is derived from the base rate by excluding the dollar value of

commercial services/benefits not eligible for reimbursement under Medicare, and adding the dollar value of any Medicare eligible services not offered to commercial enrollees.

3. Total HMO service revenue requirements per Medicare member per month for standard Medicare services are projected on the basis of utilization/complexity multipliers that are applied to the Medicare service categories in the initial rate. These multipliers should be derived on the basis of the most recent HMO experience comparing Medicare to commercial service utilization and the relative costs per unit of service for these two enrollee subgroups.

4. The ACR, or the projected total Medicare revenue service requirements for provision of the standard Medicare package, is derived by adding an amount for general and administration expenses, and subtracting the national actuarial value of Medicare copayments and deductibles projected by HCFA's Office of the Actuary for the ACR contract period.

5. The projected average payment rate, or APR, is derived on the basis of the HMO's expected distribution of Medicare enrollees by county and AAPCC risk cell classifications, and the AAPCC payment rates for the contract period.

6. A positive difference between the APR and the ACR constitutes savings. The HMO may return these savings to the federal government, deposit up to 15 percent of it to a benefit stabilization fund, and/or pass them on to Medicare enrollees in the form of additional benefits to the standard Medicare package and/or reduced premiums.

7. The maximum allowable premium an HMO may charge for their chosen basic package of benefits is equal to the actuarial value of Medicare copayments and deductibles, plus the projected dollar value of benefits exceeding the basic Medicare package, minus the savings returned to Medicare enrollees. This maximum premium may be partially or fully waived by the HMO.

A simple hypothetical example that illustrates the mechanics of HCFA's standard ACR methodology is contained in Appendix C.

In addition to the basic 7 steps of the ACR calculation process, HCFA requires that for plans' ACR proposals:

- the rates must be broken down into service categories;
- supporting data and detailed computations must be submitted for all elements of the ACR proposal;
- data is subject to audit verification by HCFA representatives;

- a plan with no historical Medicare utilization statistics may use only published statistics recognized in the industry; and
- the value of additional or optional supplemental benefits have to be computed in the same manner and supported to the same degree as the Medicare covered services.

## II.C HCFA's Current ACR Review Process

There are four major aspects to HCFA's current ACR review process. First, prior to ACR application, HCFA provides materials and offers workshops. Second, the review itself involves desk audits of ACR applications and, in some cases, assessments of plans' financial viability. Third, in a few selected cases, site visits of HMOs are conducted. Finally, HCFA communicates the results of its review to the plans.

TEFRA's regulations specify two time-related milestones in the ACR application process. AAPCC rates are published at least 90 days before the start of a calendar year contract period begins. HMOs' ACR applications are due at HCFA by 45 days before the contract period begins (i.e., November 15 for a calendar year contract). Although regulations do not specify a timetable for HCFA's completion of its ACR application reviews, it is noted that attempts will be made for these reviews to be expeditious (HCFA, 1985).

### II.C.1 HCFA's Informational Activities

The materials that HCFA's OFM sends to plans prior to their submission of ACR applications includes the following: (1) an organizational chart of OFM (which includes the regional responsibilities of the ACR reviewers in HCFA's central office), OFM's

telephone numbers, and a map of HCFA's regional office boundaries; (2) a two page description of the ACR proposal requirements, including the per member per month actuarial equivalency of Part A and B deductibles and coinsurance; (3) a five-page quantitative example of an ACR submission, broken down by service category (inpatient hospital, skilled nursing, etc.) with a column for each of the steps in the ACR methodology, plus sample supporting documentation; and (4) a two-page bibliography of published studies available for plans new to Medicare to use for their Medicare utilization (volume and complexity) factors.

In addition to sending materials to plans, HCFA's OFM holds a half-dozen seminars throughout the year for HMOs seeking further information. At the seminar, for example, plan representatives have the opportunity to converse face-to-face with the HCFA reviewer of their HMO's ACR application.

#### II.C.2 OFM Reviews of ACR Applications

Since the main types of activities involved in reviewing the ACR application are auditing in nature, the HCFA reviewers in OFM are accountants by training, including a number of CPAs. At one time, the responsibilities for financial monitoring of Medicare contracts was decentralized to HCFA's regional offices and, subsequently, has been centralized again in an attempt to maximize review uniformity.

While HCFA requires plans to breakdown their utilization data by service category and provides HMOs with a sample ACR application, OFM does not have a standard set of forms that plans complete. As a result, part of OFM's task is to verify that plans have completed all

of the steps of the ACR calculation process. In particular, HMOs' documentation of ACR calculations is non-standardized in format and content.

Another aspect of HCFA's current ACR review process is distinguishing those applications which receive the long from the short desk review. This distinction was made because of the large number of ACR applications that HCFA reviews in a relatively short time-frame. The long ACR reviews are reserved for plans with the greatest potential impact: plans with the largest memberships and large HMOs in "non-competitive" market areas (i.e., areas with less than three TEFRA HMOs).

The long version of the ACR desk review has three major sections. The first section includes general and summary areas such as the mathematical correctness of the application and whether all principal service categories have been included. The relatively long middle section covers the review of methodology and computations, in order of the ACR calculations. Both the ACR calculations and the documentation for those calculations are reviewed for reasonableness (e.g., comparison to plan's previous ACR application) and mathematical correctness. The final section of the longer review protocol is brief and concerns following up with the plan regarding its ACR application.

The shorter ACR desk review has the cover page and a condensed version of the methodology and computations review. All of the questions on the short review have been taken from the longer version.

In their ACR applications, plans do not disclose their commercial profit rate; this rate is implicit in the commercial premium and could

be negative. All that OFM can glean from ACR applications, as part of the desk review process, are situations where HMOs project financial losses relative to their commercial business. Plans project such losses if they voluntarily accept a lower enrollee premium than is called for by their revenue requirements and/or their ACR exceeds their APR. ACR applications with projected TEFRA losses are evaluated in light of the HMOs' overall financial viability which involves input from OPHC's Office of Compliance.

HCFA reviewers routinely contact plans if there are any problems with the ACR application. The nature and scope of these problems range from mathematical errors in the calculations to inadequate supporting documentation. Although problem resolution can be an iterative process, both HCFA and plans are keenly aware of the time limit imposed by the January 1st start date for plans with calendar year contracts.

#### II.C.3 On-Site ACR Monitoring Reviews

There are a number of circumstances under which OFM may make a site visit to an ACR applicant. These situations include plans in financial difficulty that insist on renewing TEFRA contracts, HMOs with the largest number of TEFRA members, and those which have problems with completing ACR applications (particularly, providing appropriate data) according to HCFA's specifications.

In an on-site visit, the plan is not required to "open its books," but rather, OFM uses a 13-point checklist to verify the plan's financial status and the ACR's completeness. The focus of the checklist is on the plan's documentation of the ACR and, in some cases,



plans are asked to provide additional information to corroborate the ACR. Other value from on-site visits can include: examining a plan's management information system to determine if the appropriate data are being collected, provide some ACR training, and to show that OFM is actively reviewing plans' ACR applications.

Within the last couple of years, the more routine on-site visits have become less frequent as OFM personnel and travel funds have been curtailed. As a result, site visits have been limited to high priority plans.

#### II.C.4 Communication of Approved ACR to Plans

If an HMO's ACR application is approved, HCFA notifies plans in writing according to a standard format which also documents the benefit and premium offerings for the contract period. During the contract period, the only change a plan can make is to reduce the enrollee premium and only with HCFA's prior approval. The approval notification has six components: 1) cover letter; 2) general information, contract period and geographic area; 3) basic benefit package; 4) high option benefit package, if any; 5) optional benefits ("riders") and related copayments, if any; and 6) ACR computations.

The ACR computations section of the approval letter is quite lengthy as it summarizes the approved ACR application. First, there is the initial rates and volume/complexity factors for the basic Medicare benefits and other health benefits. Next is the calculation of plan savings or loss, identifying how much of any savings will be distributed to beneficiaries. Then the other health benefits are

broken out by their actuarial value, on a per member per month basis. Finally, the Medicare enrollees' premium is calculated based on the deductible and coinsurance, other health benefits, amounts returned to HCFA, and plan savings returned to enrollees. Any enrollee premium waived by the plan also is noted.

#### II.D The TEFRA Risk Program

In evaluating the ACR requirement it is important to gain some perspective about the TEFRA risk program in which the ACR functions and the characteristics of participating TEFRA risk HMOs. In this section we provide some background data about the TEFRA program and the kinds of plans participating in the program.

Over two years have passed since the first TEFRA risk contracts were signed in April of 1985. As of March, 1987 151 plans had signed TEFRA risk contracts with HCFA. Thirty-two risk contract applications were pending approval. Since the inception of the TEFRA program, the number of TEFRA Medicare beneficiaries enrolled in HMOs under TEFRA risk contracts has grown dramatically. As of March, 1987 TEFRA risk enrollment exceeded 867,000 members. The program in relative terms is still in its infancy. Current TEFRA risk HMO enrollees only amount to roughly three percent of all Medicare beneficiaries.

More than a majority of these TEFRA risk plans were IPA models (58.3%); the next largest category was group (21.2%) and then staff models (15.9%). In terms of plans' profit status and chain membership, almost three-fifths (59.6%) were non-profit two-thirds (66.9%) were chain members.

Over half of the plans had participated in TEFRA for all three years (55.0%) and more than three-fifths (61.3%) had no Medicare experience prior to TEFRA. Slightly more than one-fifth of plans had previous experience as Medicare demonstration sites. The limited number of plans with pre-TEFRA Medicare experience is reflected in their relatively low enrollments: 72.2% of the plans had Medicare memberships with less than 5,000 enrollees. Only 12.6% had Medicare enrollments exceeding 10,000 members.

Over one-third of the plans to date (37.1%) serve geographic areas where no other TEFRA risk HMO is in operation. Nearly 42% of plans serve what might be termed "competitive" market areas, defined as 3 or more plans serving the same Metropolitan Statistical Area (MSA). The remainder are located in MSAs served by two TEFRA risk plans.

Appendix A to this report contains some empirical findings from a descriptive quantitative analysis of 1987 ACR data for the 151 plans described above. While we draw from these empirical results in support of findings in Sections II and III of this report, a more complete discussion of statistical regularities in ACR data may be found in Appendix A.

### III. ASSESSMENT OF THE ACR: ADMINISTRATIVE ASPECTS

In this section we discuss our findings concerning administrative aspects of the ACR methodology. The following section contains our findings concerning the overall accuracy of the ACR methodology and its particular components. In Section III.B we discuss the data burden on HMOs associated with ACR development. Section III.C addresses problems associated with the regulatory review of ACR proposals.

#### III.A The Accuracy of the ACR Methodology

A central question in evaluating whether the ACR methodology is working is whether it yields valid and accurate estimates of the actual revenue requirements for serving the Medicare population. Data on the actual Medicare cost experience of HMOs that can be compared to ACR projections and HMO prospective budgets are needed to properly answer this question. While TEFRA HMOs report revenue and cost data to the Office of Compliance in the OPHC, cost data are reported such that Medicare costs cannot be separately identified. In the absence of HMO cost data, we could only address sources of potential inaccuracy in the ACR methodology through interviews and our own review of ACR proposals.

Below we summarize our findings concerning potential sources of inaccuracy for particular components of the ACR methodology. This is followed by an overall assessment of the accuracy of the ACR methodology.

### III.A.1 The Base Rate

The base rate charged by an HMO in its commercial market serves as a crucial benchmark in the standard ACR methodology. It is exogenous to the projection of total Medicare revenue requirements in the sense that it is determined through market factors in commercial premium development. The HMO's commercial community rate was viewed as an easily verified starting point for ACR development. Rates approved by state insurance regulators or marketing brochures could serve to document the HMO's aggregate base rate in their ACR proposal.

The attractive simplicity of a single community rate serving as the benchmark of the ACR methodology has been diminished as HMO rating systems have become more complex. Community rating by class or experience rating by employer group can also serve as the basis for premium development for CMP's. In these situations the base rate is actually a weighted (by size of enrollee groups) average of premiums charged to different employer groups. The increased number of assumptions (e.g., relative enrollment sizes, risk class mix, etc.) involved in these aggregate base rate projections raises a concern about the greater potential for HMO error and rate manipulation by invocation of convenient assumptions.

HMOs must provide documentation as to how their aggregate base rate premium was computed. Verification of this amount by OFM reviewers is limited largely to checking computational accuracy of the supporting data. On-site audits of HMO supporting data have not revealed serious problems. However, the lack of rigor in these audits makes it difficult to truly assess the extent of any problem.

### III.A.2 The Initial Rate

In the first step of the ACR methodology, plans must decompose their commercial base rate into a series of service categories for the purpose of deriving an initial rate projection conforming to the same time period of the base rate. This service decomposition is usually done on the basis of allocation of recent commercial expenses by service category. While some plans provide finely detailed disaggregation of services, at minimum services must be disaggregated into a standard set of Medicare service categories.

Only Medicare eligible services should be contained in the initial rate. Thus, adjustments must be made when services covered in the commercial premium are not eligible under Medicare, and when Medicare eligible services are not covered in commercial premiums. Since the initial rate is the basis for adjustments by utilization/complexity factors in the ACR methodology, the accuracy of the ACR will be affected when expenses are improperly allocated to Medicare service categories, and/or proper adjustments for coverage differences are not made.

Two types of potential accuracy problems exist in computation of the initial rate. First, since different utilization/complexity factors are applied to individual service categories, an incentive exists for allocating expenses to categories with greater multipliers when any ambiguity exists in classification. Second, because of inadequate plan data, many plans either resort to published studies to

make adjustments for commercial services not covered by Medicare, or do not make warranted adjustments at all.

Without a rigorous audit of detailed financial data, the extent of the first problem cannot be assessed. Regarding the second problem, two HMOs acknowledged that their ACR had a small contingency slack built into it, one source being that certain services were not removed from the base rate in deriving the initial rate.

Given that base rate adjustments in ACR proposals generally amount to roughly 5 percent of the base rate, the overall impact of any errors due to inadequate adjustments on an ACR projection is likely to be small. Nevertheless, the lack of uniformity in making adjustments, and reliance on secondary data for some adjustments, is indicative of some potential leeway in initial rate development that may affect accuracy.

### III.A.3 Utilization and Complexity Multipliers

Given that the distribution of medical care utilization in populations tend to be both wide and heavily skewed, an obvious source of potential inaccuracy in the ACR methodology stems from potential errors arising from the random fluctuations in utilization. Summary data provided to us by OFM can give a perspective of the variations in the multipliers for the two largest service categories comprising the ACR, namely inpatient hospital and physician services.

The mean and standard deviation of the 1987 hospital multiplier for 105 HMOs for which data were available was 5.62 and 1.07, respectively. The minimum and maximum hospital multipliers for these

plans were 2.27 and 8.80. About 56 percent of the HMOs had hospital multipliers between 4 and 7. While the variance in hospital multipliers across HMOs is fairly substantial, it could represent real differences in the relative utilization/costs of commercial and Medicare enrollees across plans. A more revealing statistic about fluctuations may be the change in the multiplier between years.

Multiplier data were available for 53 HMOs submitting ACR proposals in both 1986 and 1987. The mean and standard deviation of the absolute difference between hospital multipliers in these years was 0.92 and 0.79, respectively. This change (positive or negative) amounts to about 16 percent of the mean 1986 hospital multiplier for a sample of 79 HMOs submitting 1986 ACR proposals. The relative size of the standard deviation to the mean suggests a large variance in these changes. The minimum and maximum absolute changes were 0 and 2.99, respectively. The mean change which can be either positive or negative was only -0.13. This is suggestive of random influences since fluctuations in either direction were just as likely.

The physician service multipliers were found to be more variable across HMOs in any year and over time. The mean and standard deviation of the 1987 physician service multiplier were 2.62 and 1.23, respectively. Physician service multipliers ranged from 1.4 to 10.6 in 1987 among 105 HMOs for which data were available. About 47 percent of physician multipliers fell between 2 and 3 in 1987. Between 1986 and 1987 the mean and standard deviation of the absolute change in physician multiplier were 0.96 and 1.38, respectively. The mean absolute change was about 36 percent of the mean 1986 multiplier. Some



actual changes in physician service multipliers were quite large, ranging from -4.94 to 3.38.

Changes in these multipliers might be expected to be substantial between an HMO's first and second year ACR proposal. Whereas a first year proposal is generally based on secondary data, subsequent years are supposed to be based on actual plan experience. Stratifying HMOs into two groups on the basis of whether 1986 was their initial ACR proposal or not was supportive of this proposition. The mean absolute change in hospital and physician multipliers between 1986 and 1987 for a sample of 14 HMOs submitting their first ACR proposal in 1986 were 1.04 and 1.36, respectively. The corresponding mean absolute changes in hospital and physician multipliers for 52 longer tenured TEFRA HMOs were 0.86 and 0.85, respectively.

The data suggest that hospital and physician multipliers do exhibit significant yearly fluctuations, but that these are likely to diminish as the TEFRA program matures over time. Discussions with actuarial consultants suggested that HMO age and size were important in generating reliable multipliers. It was felt that a minimum enrollee-month base of approximately 30,000 (about 2,500 enrollees) was needed to begin generating estimates with any credibility. A minimum enrollee-month base of about 50,000 enrollee months (about 4,000 enrollees) and 3 to 4 years of experience in controlling Medicare utilization were suggested to lead to fairly stable utilization patterns that could be relied upon for meaningful multipliers. Only 20 TEFRA HMOs with risk contract experience in prior HCFA HMO demonstrations currently satisfy the latter criterion.

A fairly widespread contention voiced by both HMOs and actuaries was that the predictive accuracy of the ACR could be improved by adjusting multipliers to capture short run trends in utilization, or expected changes in service cost factors arising, for example, from recent renewals of Medicare provider agreements. No data were made available to us to support these contentions.

Our interviews did suggest that accuracy was a more significant problem for novice Medicare HMOs using utilization/complexity multipliers derived from published sources approved by OFM than for plans using multipliers derived from historical utilization and cost data. One actuarial consultant, (whose clients were limited to IPA models), remarked that public utilization/complexity multipliers acceptable to the OFM understate the relative difference in revenue requirements between Medicare and commercial enrollments for novice plans with little, if any, experience in controlling utilization of the elderly.

Two actuaries remarked that client HMOs had declined participation in the TEFRA risk program due to the fact that secondary published multipliers were too small to derive an ACR that correctly reflected expected Medicare revenue requirements. In one instance, the HMO had extremely low utilization in their commercial business that was unlikely to exist on a relative basis for Medicare enrollees. In the other instance, the HMO had negotiated very favorable capitation agreements with physician groups for their nonelderly commercial enrollment. An equally favorable capitation agreement could not be negotiated for Medicare enrollees.

In the opinion of the actuaries citing these examples, the situations described above represent peculiar exceptions to the norm. In general, it would not appear that reliance on published multipliers in an initial ACR proposal represents a barrier to HMO participation in the TEFRA risk program.

#### III.A.4 General and Administrative Expenses

One of the more variable components of the ACR methodology, not surprisingly, is the category of general and administrative expenses, or G&A. For a sample of 103 plans with available data in 1987, G&A was about 15 percent of the initial rate on average. The minimum and maximum percentages were about 2% and 28% of the initial rate.

Since little, if any, documentation about what allocations are made to G&A is provided in ACR proposals, the reasons for the large variance in G&A across plans are unknown. It may reflect a number of things, such as the relative profitability of the commercial business of various plans, differences in amounts of administrative cost overhead associated with model types, or simply differences in what costs HMOs allocate to this category versus others. Empirical analysis of differences in the percentage of the initial rate attributable to G&A among plans only revealed that the mean G&A percentage was higher in for-profit plans (18%) versus non-profit plans (13%). No other statistically significant differences were found for other plan attributes.

Three approaches for computation of G&A expenses in the ACR were found to exist. First, plans may assign the same dollar amount of G&A

that is contained in their initial rate to the ACR. Second, plans may treat G&A expenses in the same way as other medical services. This involves categorizing G&A expenses in their commercial rate, adjusting these expenses to conform to Medicare eligible services, and developing volume/complexity multipliers for each category to reflect Medicare and commercial market differences in these categorical expenses. Third, G&A may be computed in the ACR as a mark-up to projected medical services expenses using the same mark-up in the plan's commercial rate. That is, if commercial G&A is 20 percent of commercial medical service costs in commercial premiums, then 20 percent of projected Medicare service expenses may be allocated to G&A in the ACR. Plans are supposed to use the same method used to determine G&A in their commercial premium to ACR development. With few exceptions, plans utilize the third approach, or the constant percentage of service expenses, to compute G&A in their ACRs.

The mark-up approach will lead to the highest ACR projection among the three approaches. In the case of one study HMO, which categorized G&A expenses and applied individual volume/complexity multipliers to each expense category, their G&A was only about one-third of the amount that would have resulted from employing the more common percentage mark-up approach.

The combination of the lack of documentation as to what is contained in G&A and the common use of a commercial service cost mark-up suggests that most ACR projections may be inflated relative to true projected revenue requirements. Data from 103 plans for which 1987 data were available reveal that ACRs were on average 3.12 times the initial

rate. What this means is that application of the G&A commercial mark up amounts to the use of an implicit multiplier of 3.12 to G&A expenses in the initial rate. The lack of documentation as to what is contained in G&A provides an incentive to load any expenses into G&A where actual volume/complexity multipliers would be smaller. However, without access to plan financial data, we could not determine the extent to which ACRs are actually inflated through the treatment of G&A.

#### III.A.5 Average Payment Rate

In general all HMOs project their average payment rate (APR) in a similar fashion. The best estimate of the AAPCC risk class and county distribution for first year HMOs is generally believed to be the fee-for-service distribution in their county market areas. The previous year's enrollee mix distribution is generally used for HMOs with previous enrollment. The HMOs interviewed felt that APR projections were generally very accurate, and that projection errors that did arise were largely due to small shifts in the county distribution of enrollees in situations where there were significant differences in AAPCC payment levels between neighboring counties. Overall, APR projection accuracy was found to be little cause for concern.

#### III.A.6 Overall Accuracy of ACR Projections

Given the leeway afforded to plans in implementing the ACR methodology, inadequate plan documentation, and year to year variance in HMO experience data for multiplier development, ACR projections are likely to be relatively crude in terms of accuracy. While a definitive

assessment of accuracy requires comparisons of ACR projections with actual HMO cost data, a sense for the likely accuracy of the ACR may be gained through the assessments by HMOs and actuaries about the accuracy of HMO internal prospective budgets for their Medicare line of business.

It is apparently a standard business practice for HMOs to develop internal prospective budgets for their Medicare business. These budgets are not based on commercial premiums and utilization/complexity factor adjustments. Rather they are developed separately for Medicare enrollment in much the same way as commercial premiums are developed by HMOs. HMOs and actuaries voiced widespread agreement that prospective budgets were more accurate than ACR projections.

Several HMOs and actuarial consultants suggested that prospective budgets may differ from actual cost experience by 10 percent or more due to randomness associated with utilization. Furthermore, it was suggested that for an HMO using historical experience in the standard ACR methodology, an ACR may systematically differ from an internal prospective budget by up to 10 to 15 percent.

These comments by actuaries and HMOs suggest that while ACR projections may not have sufficient precision for distinguishing small differences in the Medicare revenue requirements among plans, the accuracy of the methodology is sufficient for distinguishing situations where AAPCC payments significantly exceed expected HMO costs. Two observations provide support to this argument.

First, if the ACR was easily gameable by HMOs, they would strive to obviate its function as a profit constraint by equating it to the

APR yielding a pattern of ACR variations among plans that would mirror the variations in the APR. While the average ratio of the APR to the ACR in 1987 of 0.99 is suggestive of such a correlation, we found two important systematic patterns in the average ratio (ACR/APR) in 1987 ACR proposals suggestive of credibility in ACR projections.

First, the ratio of the ACR to APR was found to be smaller in HMO market areas with 3 or more TEFRA HMOs (0.94) than in market areas with two TEFRA HMOs (1.01), or a single TEFRA HMO (1.02). Second, the ratio was smaller for third-year TEFRA plans (0.95) than for second-year (1.02) or first-year plans (1.01). Data contained in Appendix A also indicate that the average APR was greatest in markets with 3 or more TEFRA HMOs and for third-year plans. All of these differences were statistically significant.

The statistical patterns described above, indicating wider differences between ACRs and APRs for experienced plans in high AAPCC markets with multiple TEFRA HMOs, are consistent with earlier research findings suggesting that earliest Medicare HMO market entry was concentrated in high AAPCC markets with greatest profit potential (Adamanche and Rossiter(1987), Porell and Wallack(1986)). At minimum, these data suggest a limit on the extent of systematic bias between ACR projections and costs.

The use of actual historical plan data for utilization/complexity multipliers would seem to play an important role in limiting the extent that ACR projections may systematically exceed actual costs. In the case of one ACR application we reviewed, the HMO's actual Medicare inpatient hospital utilization rate based on a Medicare

enrollment of over 4,000 members was over 1,200 annual days per thousand enrollee less than the prevailing utilization rates of other TEFRA HMOs serving the same market area. Whereas the hospital inpatient multiplier based on actual experience was 5.95, the HMO argued that its projected hospital utilization in 1987 would be more typical of the prevailing use in other local plans, leading to a multiplier of 11.15.

By employing a G&A percentage of ACR that was more than twice the average for other TEFRA HMOs in 1987 together with the higher assumed multiplier, the plan had projected savings, (i.e., the APR minus ACR), of \$93.90 per enrollee month, amounting to over 29 percent of the APR. The use of a hospital multiplier based on actual experience would force the plan to distribute an additional \$90.59 per enrollee month above that already was to be distributed to beneficiaries. The maximum projected savings for TEFRA plans with 1987 ACRs was \$65.81, amounting to more than 28 percent of its APR. Justifiably, this ACR proposal was rejected by OFM.

### III.B ACR Data Burden on HMOs

#### III.B.1 Initial Rate

A fairly widespread data problem in the ACR methodology is the absence of certain plan data to adjust an HMO's commercial base rate to fit the standard Medicare package of services, i.e., the initial rate. Even HMOs with relatively sophisticated management information systems often find it difficult to retrieve some necessary data to exclude services not covered in the standard Medicare package. This problem extends to valuation of additional benefits offered in Medicare benefit



packages, since many of the same benefits backed out of the base rate are later added back as supplemental benefits.

Examples of the most commonly cited difficulties were adjustments for periodic health examinations and immunizations that are often contained in an HMO's base rate. Other examples cited by actuarial consultants and HMOs include refractions, expanded coverage for mental health visits, and coverage for inpatient hospital days exceeding Medicare limits.

Computation of many such service coverage adjustments requires detailed service level data that can be linked to specific enrollees. Whereas most HMOs are able to track major service category utilization by commercial versus Medicare enrollee groups, information systems are often inadequate to capture the detail needed for some of these adjustments.

Many HMOs have resorted to the use of published studies to make many of these base rate adjustments, even when actual HMO data is used for the bulk of ACR development. Other HMOs were observed to make no adjustments in certain cases where adjustments may be warranted.

### III.B.2 Utilization Volume/Complexity Multipliers

In general HMOs with several years of Medicare program experience do not have serious difficulties in accessing necessary data for development of utilization volume/complexity multipliers for the bulk of the Medicare service categories. Virtually all of our study HMOs with Medicare experience were able to capture data on hospital, SNF, home health, and physician service utilization. Expenditure data for

complexity multipliers, associated with differences in the costs per unit of service for Medicare and commercial enrollments, were generally accessible for the same service categories where utilization data were present.

These findings are consistent with data compiled by OFM on the use of actual versus secondary data for utilization and complexity multipliers in 136 ACR proposals for 1987. In their analysis a plan was classified as using actual experience data only when the plan derived and used separate utilization/volume and complexity factors based entirely on plan data for their ACR development. If a plan invoked any assumptions at all, did not produce separate volume and complexity factors, or relied on sampled plan data, it was not classified as using actual plan data. These data show that the fraction of plans using actual plan data for multipliers increased with the number of ACR proposals submitted.

Of the 16 plans submitting their first ACR proposal in 1987, only 2 plans used actual plan data for hospital inpatient multipliers. Four plans used actual data for physician service multipliers, and only one plan used actual data for other multipliers. Of the 77 plans submitting their second ACR in 1987, 26 plans used actual experience data for physician multipliers, 27 plans used actual data for hospital multipliers, and 23 plans used actual data for all other multipliers. Of 43 third year plans, 36 plans used actual data for physician service multipliers, 37 plans used actual data for hospital multipliers, and 29 plans used actual data for all other multipliers.

Since the CFM technically requires that actual plan data be employed in ACR proposals after the first year, the data above might suggest a problem for HMOs in accessing the necessary data for multiplier development. The small fraction of second year plans using actual data is largely due to the fact that many second year plans did not have a sufficient base of enrollee months from the first year to produce credible utilization rates. Many second-year plans only began enrolling in mid-year of 1986, and/or enrolled only a small number of Medicare beneficiaries. While the fraction of third-year plans classified as using actual data is large, it would appear that this fraction understates the number of HMOs capable of using actual plan data. At least one of the third-year plans was classified as not using actual data because it adjusted their experience-based multipliers to reflect planned targets for lowered Medicare utilization rates in 1987. While it is true that actual data were not exclusively relied upon in their ACR, the plan was able to produce the necessary data for multiplier development.

The most serious data problem revealed in our interviews is associated with development of complexity multipliers for physician services in HMOs where physician payments were based on salary or capitation arrangements. Whereas HMOs receiving claims for individual physician encounters can make complexity adjustments on the basis of charges, such simple adjustments cannot be made by HMOs without encounter level claims data.

In the past HMOs were able to use a standard complexity factor of 1.2 to adjust commercial enrollee physician service expenses for their

Medicare enrollment (Stiefel and Cooper, 1984). This same standard factor was allowed for apportioning the cost of physician services for Part B Medicare Health Care Prepayment Plans. TEFRA HMOs now are required to develop their own complexity factor adjustments. Time studies or relative value scale studies conducted by individual HMOs are acceptable to OPHC for this purpose. Given the high costs of such studies, this requirement of HMO-specific documentation of complexity of physician service costs was viewed as burdensome to HMOs since it is generally recognized that physician service costs are higher for the elderly Medicare population.

### III.B.3 Overall Data Burden of the ACR Methodology

On the basis of our interviews with Medicare HMOs it appears that HMOs do not view most components of the ACR application as being unduly burdensome. Rather, it would be fair to characterize the ACR as being more of a "minor nuisance" to HMOs since their internal prospective budgets and ACR proposals use similar data. In general, IPA models using claims as a basis for provider payments faced the least difficulties in accessing necessary data. Such billing systems often provided sufficient detail about individual services for adjusting average commercial rates and development of utilization/complexity multipliers. IPA models comprise nearly two-thirds of all TEFRA HMOs.

Models with salaried or capitated physicians faced the greatest difficulties in accessing detailed service level data, since claims are not required for payment purposes. These HMOs generally had to resort to sample data to develop the ACR. Network HMOs with external

affiliated provider groups may sometimes face an added problem of being unable to draw sample data from some providers. Failure to randomly sample from all providers could result in biased multipliers in these situations.

### III.C Burden of the ACR Review Process

The effectiveness of the ACR as a regulatory tool appears to be hampered by administration problems in the review of ACR submissions and the absence of rigorous auditing of HMO financial and utilization data. In this section we discuss some problems faced by OFM and plans in the ACR review process.

#### III.C.1 Time Schedule for ACR Reviews

OFM is faced with administrative problems in reviewing ACR proposals stemming from both the dramatic growth in the number of plans electing to enter into TEFRA risk contracts in the brief history of the program and an uneven workload over the calendar year. Whereas 39 plans served Medicare beneficiaries on an at-risk basis through demonstrations prior to the start of the TEFRA program, 151 plans had risk contracts by March, 1987. The great majority of these plans are on a calendar year contract basis. Since ACR applications are not due until 45 days before the onset of a new year, and AAPCC rates are not published until September, a rush of applications arrives at HCFA for review.

The CFM employs a staff of 19 professionals in their Division of Medicare Payments who are responsible for review of ACR proposals. This workforce has been supplemented with temporary employees in the past to process the peak load of ACR proposals at the end of the calendar year. This peak load problem has compromised strict adherence to the standard ACR protocol in some ACR proposals. Temporary employees may not possess the necessary experience to carefully review ACR proposals with the same consistency as regular staff. Time and manpower pressures may affect the performance of regular staff reviewers as well. Reviewers told us that infrequently some ACR applications that seem "reasonable" are approved due to these pressures, even though they might deviate from the specific ACR protocol.

An example of this problem is that some plans were able to employ a prospective budget approach in their ACR proposals rather than the standard ACR methodology. Under the prospective budget approach to ACR derivation, plans work backwards through the ACR methodology. Total revenue requirements are forecasted directly by the HMO on the basis of historical experience and anticipated changes in the service costs for serving the Medicare population. The HMO's initial rate, (derived from its commercial community rate), therefore does not function as a true exogenous base for ACR derivation in this approach. For each service categories, the initial rate instead becomes a simple benchmark from which utilization/complexity multipliers may be calculated for reporting purposes. These calculated multipliers may deviate from

multipliers based solely on historical experience as required in the standard ACR methodology.

The handling of service adjustments of the base rate to form the initial rate is another example. Obstetrical services, for example, are technically eligible Medicare services since disabled beneficiaries may enroll in TEFRA HMOs. Given the low prevalence of such services in the Medicare population, some reviewers require that these services be removed in deriving the initial rate. Others do not require that adjustments be made given that an HMO may enroll disabled beneficiaries.

The CFM is quite aware of the problems arising from the year end peak load of ACR submissions, and it has taken some steps to address them. Use of short and long ACR desk reviews represents one example of this. The CFM also has proposed that contract years be staggered into two groups, where the contract year for one group would begin in July rather than January. This proposal has been rejected on the basis that a mid-year AAPCC payment rate tables would be required in addition to current calendar year AAPCC rates. HCFA's Office of the Actuary maintains that resource, time, and data constraints make it infeasible to produce two sets of AAPCC projections.

### III.C.2 On-site ACR Monitoring Reviews of Plans

During the other two-thirds of the year, CFM staff effort is devoted to new TEFRA risk applications, the few plans with risk contracts that do not conform to the calendar year, and to managing HCFA's 56 TEFRA cost and 34 Health Care Prepayment Plan contracts with

HMOs. Funds for personnel and travel for on-site reviews of ACR applications have been limited. While OFM monitoring reviews have served useful purposes in the ACR review process as described earlier, they cannot be described as rigorous on-site accounting audits. Accordingly, they have not resulted in significant findings about the financial integrity of the ACR.

### III.C.3 HMO Viewpoints on the ACR Review Process

HMOs also are greatly concerned about the yearly timetable for ACR submissions and approvals. The plans do not complete their proposals until the Office of the Actuary releases the AAPCC rates in September, meaning that approval can happen as late as January. However, HMOs are not permitted to announce premium levels until such approval is granted, but are required to notify enrollees of premium hikes at least 30 days in advance of billing. Moreover, withholding premium information from enrollees can mean that by then (December or January) no other insurers are enrolling new members.

Aside from the timetable for ACR review, many plans felt that the process by which OFM reviews ACR proposals is misdirected. HMOs voiced strong opinions that ACR proposals should be reviewed more broadly by OFM for the purpose of ensuring their actuarial reasonableness. Our examination of ACR proposal files did suggest that many of the revisions made to original ACR proposals by OFM amounted to corrections of small computational errors or adjustments that often amount to a dollar or so. HMOs and actuaries complained that much time is spent with OFM staff quibbling over small dollar and cents adjustments that



have virtually no impact on the premiums charged and benefits offered by plans.

#### IV. ASSESSMENT OF THE ACR: POLICY ASPECTS

This section contains findings on the policy importance of the ACR regulations. Included are quantitative analyses of national data submitted by HMOs as part of the ACR process, as well as results obtained from our interviews. It can be stated at the outset that the HMO representatives and consultants we interviewed gave us remarkably similar viewpoints and suggestions. Exceptions to this rule did occur occasionally, and are noted in the narrative.

##### IV.A. Relative Importance of the ACR to HMOs

Virtually all of those interviewed conveyed the impression that the ACR has played a relatively minor role in Medicare risk contracts with HMOs. Much more concern was expressed about the AAPCC component of the payment system and current and future payment levels.

Plans' overall self-reported experience with the TEFRA risk program seemed to vary dramatically according to geographic area. In some cities, HMOs reported satisfactory financial performance while in other cities, HMOs were pessimistic about the future of their contracts. In no HMO geographic market area that we visited did some HMOs report favorable performance at the same time that others reported disappointing performance under Medicare risk contracts. Although all of the plans that claimed to be losing money on Medicare said that they are considering leaving the program or severely restricting enrollment if conditions do not change, none of them stated that the ACR requirement would be a factor in those decisions.

#### IV.E. Purposes and Functions of the ACR

Despite this finding that the ACR has not been a major issue for HMOs, there was widespread support voiced among those interviewed in favor of what the government is trying to accomplish through the ACR requirement. Presented below are our findings with respect to each of the purposes and functions that have been ascribed to the ACR. The first two purposes (i.e., profit constraint and vehicle to distribute excess savings) were taken from the legislation and regulations pertaining to TEERA risk contracts. Two other functions (i.e., HMO financial viability check and accountability tool) first surfaced in our interviews with HCFA staff and HMO representatives, respectively.

##### IV.B.1 HMO Profit Constraint

HMOs and actuarial consultants clearly perceived the main intent of the ACR as being an HMO profit constraint. Interviewees agreed that a profit constraint of some type is appropriate to have in order to avoid financial incentives for HMOs to take advantage of Medicare beneficiaries, e.g., through underservice. Two reasons were offered in support of this. First, it was a common belief that AAPCC payments did not necessarily correspond to HMOs' actual costs, and that some HMOs therefore may be in a position to reap large profits. Second, concern was expressed that the aged and disabled represent potentially vulnerable populations that may not recognize or react readily enough to underservice.

Pointing out the inherently higher risk involved in serving the Medicare population relative to employed groups, a few of those

interviewed believed that HMOs ought to be permitted a higher rate of return for Medicare. One HMO financial analyst commented that tying profit rates to commercial performance was "a useful starting point" for Medicare's new program, but thought that a higher rate should be allowed now that the program is getting established. Interestingly, plans for the most part suggested that they would be willing to stay in the Medicare market as long as significant losses were not anticipated over an extended period. On the other hand, it is apparently not uncommon for HMO board members or employers to seek assurance that commercial accounts are not subsidizing Medicare enrollees.

No one stated that the ACR process as currently implemented was the most accurate tool available for HMOs to ascertain revenue requirements. Moreover, it often was pointed out that the current ACR does not even measure actual rates of return. HMOs and consultants alike suggested that, in their experience, internal budgets better reflect expected performance, and that measurements other than projections, such as sufficiently detailed financial statements or fiscal audits, were much more accurate tools for revealing actual profit levels.

#### IV.B.2 Vehicle to Distribute Excess Profits

An HMO has excess savings to distribute whenever its ACR is less than its APR. The apparent overall trend is that ACRs are rising faster than APRs, so this regulatory impact on plans may diminish over time. The average ACR increased by about 8 percent between 1986 and 1987, for those HMOs with enrollments in both years, whereas APRs

increased by less than 2 percent (Maupai, 1987). Furthermore, much of the increase in ACRs is associated with increases in HMOs' initial rates, rather than higher multipliers. Analysis of data for a sample of plans with data for both 1986 and 1987 initial rates showed that the average percentage change in the ratio of the ACR to the initial rate was actually negative. These numbers suggest that Medicare reimbursements are not keeping pace with projected revenue requirements reported to HCFA by HMOs.

While over 68% of TEFRA HMOs had documented excess savings, none of the HMO representatives or consultants that were interviewed believed that the ACR requirement had any tangible impact on the premiums charged to Medicare enrollees or on the supplemental benefits offered by HMOs. This is in spite of our observation from summary ACR data that with few exceptions, ACR savings are allocated exclusively to reduced premiums and supplemental benefits.

Rather, HMOs consistently declared that in order to succeed in the market place, they need to establish a lower premium and offer benefits more generous than prevailing comprehensive Medigap indemnity policies. Another determining factor for benefit levels apparently is an HMO's existing package for commercial accounts; HMOs want to offer comparable coverage to enrollees that age into Medicare eligibility. In fact, there is no TEFRA HMO that offers just the Medicare basic benefit package; all offer reduced cost-sharing and/or supplemental benefits. To summarize, our findings were that HMOs offer extra benefits and lower premiums for reasons other than the ACR, having to do with marketing their Medicare plan.

According to HCFA staff, no HMO has volunteered to forfeit payments in order comply with ACR regulations. Indeed, industry representatives confirmed that such an action would be virtually inconceivable.

In 1986, only 5 HMOs have made use of the benefit stabilization fund (BSF) to allocate ACR savings; 3 HMOs made use of it in 1987 (Maupai, 1987). One HMO argued strongly that plans ought to dampen year-to-year variations in allowable Medicare premiums by investing in the BSF. Some HCFA staff also were concerned that more plans were not making use of the BSF because of recent premium hikes by several HMOs. In fact, nearly 60 percent of TEFRA HMOs with enrollments in 1986 and 1987 raised Medicare enrollee monthly premiums over the last year (Maupai, 1987). That analysis also suggests, however, that these premium increases have resulted from systematic and not random factors. Specifically, in 1987 HCFA introduced an adjustment to the AAPCC that was intended to reflect the interregional patterns in medical costs attributable to the Medicare hospital prospective payment system (PPS). Because of this, AAPCCs in areas with TEFRA HMOs tended to go down suddenly between 1986 and 1987 (Schuttinga, 1987), forcing plans to compensate with higher premium rates.

Overwhelmingly, consultants and HMO managers had no use for the current BSF. The most commonly cited reason was that contributions to the BSF are viewed as analogous to giving money back to HCFA. This is because HMOs cannot earn interest on deposited BSF funds, and because HMOs have to forfeit BSF funds that are unused after four years.

#### IV.B.3 Financial Viability Assessment

The conditions for HCFA's financial viability check are potentially indicative of financial distress during the upcoming year. If the ACR exceeds the APR, or if a portion of an allowable enrollee premium is waived, it would appear that a plan projects a lower return on Medicare than on commercial accounts. By comparing these projections to data on the financial standing of an HMO in its entirety, HCFA presumably assesses indirectly the likelihood of adverse impacts on Medicare enrollees (e.g., lower quality of care or termination of coverage).

Persons interviewed stated that monitoring plans for possible financial hardship was an appropriate role for the federal government, but that methods other than the ACR would be more meaningful. Measuring performance retrospectively and keeping close track of HMOs that have had problems in the past were two strategies advanced for this purpose. We were informed by HCFA that no ACR application has been rejected because a plan failed this test, but on-site audits have sometimes been necessary in order to satisfy HCFA that a plan is capable of fulfilling its obligations.

#### IV.B.4 Instrument for HMO Accountability

A tangible result of the ACR requirement is that HMOs submit to HCFA a unified document containing a considerable amount of data pertaining to past and future performance. Despite the fact that the ACR was not seen to affect HMO behavior with respect to the distribution of excess savings, most of those interviewed stated that

the ACR process served a valuable function in delivering information to HCFA about participating plans.

Virtually everyone expressed that it is important for the federal government to protect beneficiaries from unfair business practices and severe problems with quality of care, noncompliance with regulations, and windfall profits. It was felt that through monitoring the program, the government could be in a better position to spot trouble, and to decrease the likelihood that a plan would even try to take advantage.

In summary, a number of those interviewed saw the main practical impact of the ACR process was the fact that HMOs are thereby held accountable to HCFA for their past experiences, general integrity of their operations, and the reasonableness of projected revenues and costs. Many drew analogies to other governing bodies, such as state regulators or HMO board members, in essence saying that documents that are made for formal submission and approval are taken seriously by HMO managers and staff.



## V. CONCLUSIONS AND RECOMMENDATIONS

### V.A. Conclusions Regarding Research Hypotheses

#### Profit Constraint

We have attempted to evaluate whether the current ACR regulations have been effective in limiting HMO profits. It should be emphasized that our study did not include any analysis of actual HMO utilization and cost data apart from what was contained in ACR submissions. Consequently, a major limitation of the study was that comparisons could not be made between projected revenue requirements for a year (the ACR) and actual cost outcomes for the same year. Moreover, we could not directly compare any HMO's profits under Medicare with its profits under commercial accounts. We therefore have sought to test sub-hypotheses that could give some insight into the likelihood that the current ACR has been necessary and effective.

#### Validity and Reliability of the ACR

Not being able to test the profit constraint hypothesis directly, we have attempted to gain insight into the soundness of the methodology by interviewing key individuals in HCFA and in the private sector. Although it was common for people to state or imply that ACR projections could be manipulated, often when pressed, they could think of only a few ways to do so short of falsifying numbers.

It would appear that there has been significant leeway in the derivation of ACRs that would permit plans to bias applications to their own advantage. An HMO would appear to be better off when its application reflects an ACR that is almost as high as the APR. If an

ACR is low enough, then it could pose a constraint on HMO behavior. However, if the ACR exceeds the APR, plans are subjected to more scrutiny (e.g., financial viability check) but receive no higher reimbursements. Given that our interviews indicated that plans have not felt constrained by the ACR, it cannot be concluded that the ACR process has resulted in valid estimates of revenue requirements. We believe that HMOs have been able to create "cushions" for themselves, and that ACRs in many cases have been biased estimates of HMO revenue requirements.

The major issue affecting the reliability or stability of projections is the newness of the TEFRA capitation program. Over three-fifths of participating plans (62%) had no experience with Medicare prior to TEFRA and less than one year's expense data under a risk contract for the 1987 ACR. More than one-third of all plans in TEFRA had less than 1,000 Medicare enrollees, and a total of about 72% had fewer than 5,000 members. For plans with such small numbers of Medicare enrollees, there is a significant amount of random "noise" associated with cost projections. Interviews with individuals at HMOs with more experience under Medicare risk programs indicated that ACR projections had indeed stabilized after a few years.

#### Data burden for HMOs

Except for a few specific types of information, HMOs with two years or more experience have not had great difficulty generating most of the data elements required to complete ACR applications. In 1987, many plans still have not been able to base their entire applications

on their own data. As the TEPPA program matures, plans eventually will be forced to do so. Certainly for HMOs new to TEPPA, and to some extent for more mature plans, lack of certain data likely has affected the accuracy of ACR applications.

Many HMOs augmented their data systems in order to comply with the ACR regulations. Apparently, in many cases, HMOs have found the new data systems to provide information which is useful for other internal purposes such as product-line reporting. For quite a number of HMOs, however, there remain certain data elements that could continue to be difficult or expensive to produce. Since most of these data elements need not be measured on an annual basis, HMOs in general are not faced with a terribly great data burden to file ACRs.

#### Implementation issues

Much of the review process tends to be a searching for internal inconsistencies within an ACR application and the making of subsequent corrections. Enforcement of certain policies tends to be loose because of the rush to complete nearly all ACR reviews in a 45-day period. Partly as a result, HMOs have used methods (e.g., prospective budgets) and omitted certain steps (e.g., backing out obstetrical costs from the base rate) that have undoubtedly affected the ACR projections.

With a more manageable workload, HCFA would be better able to press for compliance with proper procedures and have greater confidence about their reviews. And as the use of published data by new plans lessens over time, monitoring ACR submissions for errors and for systematic tendencies will be more effective.

### Impact on the distribution of savings

The issue of HMOs distributing any documented excess profits has not been shown in our study to be affected by the ACR. Interviews with HMO representatives confirmed what HCFA staff already believed, that competitive factors in a plan's marketplace largely determine benefits and premiums. Among the plans interviewed, the ACR apparently poses no constraint on what HMOs would choose to do. Whether this is because submitted ACRs are biased to achieve this outcome cannot be ruled out entirely on the basis of this study. Given that all TEFRA HMOs have been paid their maximum allowable reimbursement (i.e., the APR) without returning any of it to the government, and that benefits and premiums apparently are governed by factors other than the ACR, the regulation apparently has not been necessary. It should be emphasized, however, that it is not possible to state with certainty that the regulation has not had an effect in this regard since the behavior of TEFRA HMOs in the absence of a binding ACR has not been observed. HMOs in our sample that were demonstration sites reinforced the finding that the ACR has never posed a constraint.

### Safeguard for beneficiaries' interests

In spite of the questionable degree to which the ACR has been accurate or has affected HMOs' choices of premium and benefits, we seem to have uncovered some evidence that it may be serving as an accountability mechanism to protect beneficiaries' interests. This conclusion in part stems from the fact that HMOs perceive the ACR

regulation as potentially having that effect on plans that participate. We would concur with this observation and say that current ACR methods are able to catch HMOs that are outliers in terms of excessive profits.

#### V.B. Administrative Recommendations for the Current ACR

A great deal of effort seems to go into carrying out the ACR regulation for TEFRA HMOs with risk contracts, at least relative to the level of impact we have been able to detect. Particularly disturbing is the distribution of the workload over the year. The time pressure on HCFA from October to January and the use of temporary help results in uneven enforcement of HCFA methodology. As a result, HMOs' understanding of the ACR process and their attitudes toward it are affected to a large extent by how their own applications were interpreted. Much of this time and effort seems to be devoted to small details in the applications, including checking arithmetic.

Two recommendations follow from this aspect of the administrative burden. First, much of the discussion about details having to do with the base and initial rates, and any historical versus projected utilization assumptions could be moved forward in the calendar year (to perhaps during the summer). The remaining elements of the application, such as calculating excess savings and Medicare premiums, could proceed as usual after publication of the AAPCC rates in September. A second recommendation in this area would be to automate parts of the application, say on a spreadsheet or data base computer program. Checking arithmetic, and processing corrections and adjustments to the

application could be done speedily using disk-based files that would accompany HMOs' submissions.

At the same time, certain components of the ACR could be better standardized so as to save HCFA time and effort. For example, all plans should be required to allocate their service costs into the same categories into which HCFA now subjectively (and sometimes laboriously) transforms all applications. HMOs are in at least as good a position as HCFA accountants to judge how costs ought to be allocated across the broader categories. In addition, certain common areas of uncertainty (e.g., how to handle obstetrics and preventive care) ought to be made explicit and applied uniformly in ACR reviews.

For new plans, it is a severe limitation that HCFA accepts only published data to adjust initial rate utilization patterns for volume and time/complexity factors. Published data are available for only a few plans (e.g., Kaiser-Portland, Fallon), and now are a couple of years old and aging rapidly. Currently, HCFA is in the process of developing a data base of volume and time/complexity factors from all TEFRA HMOs and CMPs. New plans could be permitted to utilize information from either the data base under construction at HCFA or actuarial firms' data bases. In the latter case, HCFA could follow the lead of twenty-some states by requiring that actuaries or other approved professionals be required both to certify the rates and document the assumptions (Aspen 1986). The certification should include that there are no "excessive" profits in the rates. For example, profits could be limited to the same rate that would be projected for commercial business.

It would be useful if HCFA were to conduct on-site audits of HMOs both more frequently and more rigorously than is the current practice. The purpose would be to investigate the origins and validity of data included in the ACR applications. Two types of information in the ACR application that may be difficult to verify without this type of approach are the derivation of a plan's average commercial rate (the starting point of the ACR process), and the allocation of costs to the general and administrative expense category.

In a similar vein, HCFA ought to enhance its effort to compare data submitted in an ACR application with data gathered for other purposes. For example, the Office of Compliance has revenue, cost, and utilization data from HMOs and CMPs that perhaps could be used more extensively. Another recommendation is that HCFA could maintain for each participating plan a record containing a history of previous annual projections and outcomes. Such data would allow HCFA to assess the "track record" of plans with respect to the accuracy of ACR projections and to any trends that develop.

#### V.C. Policy Options and Recommendations

This section discusses four policy options for dealing with issues currently addressed through the ACR requirement, ranging from eliminating the ACR to enhancing the current methodology. Thus, we are now considering the broader question of what type of regulation is most appropriate for the federal government to utilize with respect to TEFRA HMOs.

### V.C.1 Options

1. Eliminate any requirement for prospective rate determination, and monitor HMO performance through retrospective review of utilization and financial performance.
2. Require HMOs to submit prospective budgets, in place of the current ACR application.
3. Maintain HCFA's current ACR methodology.
4. Modify the ACR requirement so as to make projections more precise.

Choosing among these options requires that it be known explicitly what the federal government wishes to accomplish through the regulation of TEFFRA risk HMOs. Through the ACR, HCFA may want to:

- o identify outliers only.
- o precisely account for HMO revenue requirements.
- o actively control HMO profits, and/or
- o monitor HMOs more generally for actuarial and behavioral issues.

Currently, ACR applications are reviewed by accountants who are looking for computational accuracy and adherence to operational policies specified under the regulations. Meanwhile, the present regulation does not explicitly call for HMOs to be evaluated in terms of actuarial and behavioral issues. Examples of these include the reasonableness or implications of utilization rates and cost figures that are included in the submissions, and the effects certain supplemental benefits may have on enrollee decisions to join.

We believe that HCFA ought to develop some mechanism for monitoring the actuarial and behavioral aspects of the capitation program. It is not certain whether an ACR type of regulation is the



best method for achieving these objectives. However, it is quite possible that the same basic documentation requirement (e.g., an ACR) could serve a range of purposes for HCFA.

In addition to specifying the goals of the regulation, it would be necessary to have other information in order to make a completely informed decision among these options. This includes information such as the distribution of actual HMO profits under Medicare risk contracts, and the extent that plans may obtain favorable selections of beneficiaries. Profits due to efficiency may be quite acceptable, whereas favorable selection would expose a severe limitation of using the AAPCC alone. A second crucial area has to do with how accurate the current ACR really is. The U.S. General Accounting Office is currently investigating an aspect of this question in a small sample of plans, looking at supporting documentation for ACR applications. One would also need to compare ACR projections with actual cost outcomes to know whether it needs to be improved.

#### Comparison of the Alternatives

Under Option 1, the government would have a reporting requirement that could be used to identify plans that appear to be outliers in terms of utilization rates and profit levels. Alerted by this information, the government could pursue further scrutiny into marketing, quality, and compliance. For these purposes, the most efficient and accurate method of measuring HMO performance is to review audited figures pertaining to past periods.

Retrospective information from plans may be obtained from other reporting requirements already in place, such as quarterly and annual reports to HCFA's Office of Compliance for CMPs and federally qualified HMOs. These reports should be augmented by distinguishing Medicare from other enrollees for appropriate utilization rates and costs.

Options 2 through 4 represent prospective rate determination requirements, and are preferable if the government perceives a need to integrate HMO cost information with payments derived from FFS costs (AAPCC rates) in order to limit HMO profit potential from favorable selection and/or underservice. The advantages of a prospective approach generally are that a linkage to rate determination is established, a profit level is specified and that a greater potential exists for identifying problems earlier, hopefully before they occur. A potential disadvantage is that low use rates and savings that are attributable to efficiency result in lower payments for the basic Medicare services.

The relative advantages of Options 2-4 hinge on the precision of the estimates of revenue requirements and profits. Options 2 and 3 are likely to have significant systematic effects on HMO payment levels only for plans whose costs deviate substantially from APR levels (i.e., outliers). Choosing between options 2 and 3 depends on the perceived value of achieving higher precision (i.e., what constitutes outlier status) through more costly and extensive review procedures.

Under Option 2, every year HMOs would provide HCFA with utilization assumptions underlying last year's projected revenue requirements, last year's actual utilization, and the utilization

assumptions underlying this year's revenue requirements. For a new plan, HCFA could require that the assumptions and actual utilization data be certified by a professional actuary; for an experienced plan, HCFA could require the certification of the plan's chief financial and executive officers, and Board chairman.

Despite the potential that such an alternative could work, the current ACR methodology provides HCFA with a more explicit derivation of rates. By using commercial business as a benchmark, under the current system (Option 3), the government makes efficient use of two important aspects of performance. First, HMCs reveal through their average community rate what level of profit is adequate to engender supply of services. Second, within each HMO, HCFA is given explicit information about how Medicare performance differs from commercial business across individual service categories.

Option 4 would address these weaknesses through explicit corrective action. Some potential areas for improvement in the current methodology have been identified in this report. The payoff would be in reducing areas of discretion which may detract from the precision of ACR estimates, and which contribute to difficulties in comparing applications across plans. It would be very speculative for us to estimate how much improvement could be gotten from tightening up the ACR methods.

## V.C.2 Recommendations

We recommend further studies to:

- o determine through actual HMO cost data, whether profit rates for HMOs under Medicare exceed those under their commercial lines of business (Some limited insights may be gotten from formal evaluations of the Medicare Competition Demonstrations and the TEFRA risk program.); and to
- o verify the existence and accuracy of data necessary to derive and support HMO ACR applications. (GAO expects to report their findings this year for a sample of four TEFRA HMOs.)

On the basis of our findings, we recommend that:

- o HCFA require TEFRA HMOs to submit actual utilization and cost data for Medicare beneficiaries (Option 1); but that
- o HCFA maintain the current ACR requirement until a system is in place to review revised HMO data reporting and to investigate outlier plans.

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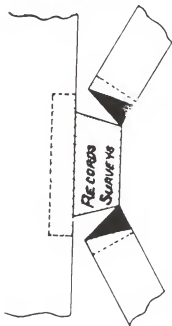
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## APPENDIX A

### PRELIMINARY QUANTITATIVE ANALYSIS OF ACR SUBMISSIONS

This section will present a descriptive analysis of data contained in the material submitted to HCFA by HMO and CMPs in order to document their Average Community Rate. We will report primarily upon the 1987 data. The following section contains a description of the data made available by HCFA's OFM for this analysis and a discussion of their limitations. This is followed by a presentation of empirical results.

#### I. DATA SOURCES AND RESEARCH FILE

A multi-year research data file was constructed by the merger of 4 data files provided by HCFA and a fifth file which we constructed ourselves from copies of ACR approval correspondence sent by OFM to TEFRA HMOs after OFM review.

Two of the data files were supplied to us from HCFA's Office of Compliance in the Office of Prepaid Health Care (OPHC). Both of these files contained data that has been customarily contained in the OPHC's monthly TEFRA Contract Status Report. Particular data items included TEFRA plan number, model type, profit status, chain membership, geographic location, TEFRA risk enrollment, previous Medicare contract experience (i.e., demonstration site, cost contract, etc.), Medicare basic premium amounts, and a set of categorical variables denoting whether co-payments are required and whether additional benefits are contained in plans' Medicare benefit packages. In addition to these published data, the files contained each plan's ACR and APR. One of

the two files contained 1987 data; the other contained 1985 and 1986 data.

The other two data files supplied by OFM were constructed from data in 1986 and 1987 ACR proposals. The data items included the TEFRA plan number, the dollar amounts for the standard Medicare service categories and G & A in the initial rate, the volume/complexity multipliers for the service categories, and the initial rate. Whereas the other two data files contained data for all HMOs and were carefully edited, these files were incomplete and contained numerous coding errors. The data were edited to obtain consistency to the extent possible without reviewing actual ACR proposals for each plan. While there was little evidence of systematic bias in the distribution of plans with data in the 1986 file, the 1987 file was geographically biased by omission of plans from certain geographic markets such as Miami, Florida.

The fifth data file was constructed with data from a random sample of TEFRA HMOs operating as of March, 1987 along with HMOs in our study. The total sample amounted to 67 HMOs. Data items pertaining to the dollar value of savings allocated to additional benefits, lowered premiums, and waivers of allowable premiums were contained in this file.

The five files described above were merged together by matching TEFRA plan numbers to form the research file. Due to incomplete data in some files and sampled data in others, the number of valid observations for particular data elements in the final research file varied. Thus, the sample sizes for the empirical analyses described in the next section varies for this reason.



## II. EMPIRICAL RESULTS

### 1. Plan Characteristics

Before examining the specific data that were reported by the plans, it is worthwhile to examine some of the characteristics of the plans. Differing plan characteristics will serve as a useful dimension along which to compare ACR elements, and it is primarily for this reason that the data presented in Table 1 on plan characteristics are discussed here. In addition, these data provide a useful profile of plans participating in the Medicare program under TEFRA.

As of March 1987, there were 151 plans with TEFRA risk contracts. These health plans represented a cross-section of HMO-types: nearly three out of every five (58%) were IPA model-plans, while more than one-third (37%) were either staff or group models. A small number of plans (5%) were network-model HMOs.

Three-fifths (60%) of the plans participating in TEFRA in March 1987 were not-for-profit. A little over two-thirds (67%) were a part of an HMO chain.

There was considerable variability in Medicare experience reported by the plans prior to TEFRA. More than three-fifths (62%) had no Medicare experience prior to TEFRA. Approximately one-fifth (23%) had been Medicare demonstration sites prior to TEFRA, while nearly two-fifths (39%) had had some form of cost-contract with the Medicare program before participating in a risk-contract under TEFRA.

It is also worthwhile to look at the number of years the different plans had participated in TEFRA. This was determined from the number of years plans had provided ACR submissions. Thus, for example, if a

Table 1: Characteristics of HMOs and CMPs With 1987 ACR Submissions

<u>Characteristic</u>	<u>Category</u>	<u>% of Plans</u>
HMO Model	Group	21.2%
	IPA	58.3%
	Network	4.6%
	Staff	15.9%
Profit-making status	For-profit	40.4%
	Non-profit	59.6%
Total number of plans in SMSA	one	37.1%
	two	21.2%
	three or more	41.7%
Medicare experience prior to TEFRA	Demonstration	22.7%
	Cost or Pt. B	38.7%
	None	61.3%
Number of Medicare enrollees-3/1/87	< 1000	33.8%
	1-5000	38.4%
	5-10,000	15.2%
	10,000+	12.6%
HMO is part of a chain	Yes	66.9%
	No	33.1%
Years of Participation in TEFRA	1	8.0%
	2	37.0%
	3	55.0%
Total No. of Plans		151

submission was provided for 1985, 1986, and 1987, it was assumed that the plan had participated for three years.

More than half of the plans (55%) had three years of TEFRA participation; 37% had participated for two years while only 8% had one year of participation. Thus, although (as discussed above), the majority of plans were new to the Medicare program in the sense they did not participate in Medicare prior to TEFRA, most plans have had at least two years' experience under TEFRA.

There is considerable variation in the number of Medicare enrollees in participating plans. There appear to be many plans with only a small number of Medicare enrollees: more than one-third (34%) had less than 1,000 Medicare enrollees and nearly two-fifths had between 1,000 and 5,000 Medicare members. The remaining plans had larger Medicare participation: 15% had 5-10 thousand members and 13% had over 10,000 members.

It was anticipated that financing characteristics could vary considerably depending upon the degree of competition in the particular market area in question. For this reason, it is important to specify whether a plan is in a competitive area. It was found that over two-fifths (42%) of the plans were in Standard Metropolitan Statistical Areas (SMSAs) with a total of three or more plans participating in Medicare under TEFRA. For the purpose of our analysis, we will regard these as competitive areas. Almost two-fifths (37%) of the plans were the only Medicare plan in an area and one-fifth (21%) were in areas with another Medicare plan.

## 2. Summary Statistics

Table 2 provides summary data for the major components of the ACR calculation, as well as for several ratios that are useful in interpreting these data. The following is a brief discussion of these data. The cost data presented in this table are in dollars per member per month.

### a. Adjusted Community Rate (ACR)

The ACR displayed considerable variability across plans. While the average was \$187 per month, the lower and upper figures differed by nearly a factor of three (\$301 versus \$120 per month).

### b. Average Payment Rate (APR)

The APR had a mean value of \$193 per month, only slightly larger than the ACR. Its variability was quite similar to that of the ACR.

### c. Ratio of ACR and APR

The ACR and APR appeared to track quite closely. The average ratio was nearly .99. This average varied from .71 to 2.02. It is surprising to find a plan with such a high ratio. The standard deviation of .17 suggests that a substantial number of plans had ACRs that were 0-15% higher than the APR, which means (assuming the accuracy of the ACR) that many plans were willing to participate in the Medicare program even though they would apparently realize a considerably smaller return than they are able to realize for their under 65 population.

Table 2: Summary Statistics\* of Items Reported as Part of  
1987 ACR Submission

<u>Characteristic</u>	<u># of Plans Reporting</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Min</u>	<u>Max</u>
Average Community Rate	151	187.43	35.82	119.58	300.93
Average Payment Rate	151	192.55	35.63	124.48	282.15
Ratio of ACR and APR	151	0.985	0.173	0.713	2.02
Proportion of Plans with ACR > APR	151	0.318			
Initial Rate	105	59.17	10.57	18.63	92.94
Total Cost of Additional Benefits	67	15.27	9.91	0	42.43
Ratio of Cost of Additional Benefits and APR	66	0.075	0.047	0	0.158
Total Savings	67	14.26	15.93	0	65.94
Allowed Premium	67	36.36	16.46	0	77.87
Ratio of Allowed Premium and APR	66	0.19	0.088	0	0.332
Administrative Costs and Profit	103	8.95	4.29	.30	26.28
Ratio of Admin. Costs and Initial Rate	103	0.149	0.054	.016	0.283
Amount of Allowable Premium Waived	67	9.81	13.93	0	77.87
Time&Complexity Multipliers					
Hospital Multiplier	105	5.62	1.08	3.45	8.80
Physician Multiplier	100	2.75	1.11	1.41	10.62
ACR/Initial Rate	103	3.22	0.77	2.09	9.07

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\*Cost figures represent dollars per month

d. Initial Rate (105 plans reporting)

The Initial Rate averaged \$59 per month, with variations from \$18 to \$92.94 - an even greater range than for either the ACR or APR. The Initial Rate provides an estimate of an HMO's costs for providing the Medicare benefit package to its under 65 population, with the simulation carried out using actual HMO cost and utilization data, whenever possible. This wide variability may represent errors in estimates by some HMOs that are outliers. The standard deviation - \$11.00 per month - is a more reasonable measure of the overall variation in this quantity.

e. Total Cost of Additional Benefits and Ratio of these Costs and the APR (67 plans reporting)

Additional benefits over and above the Medicare benefit package averaged \$15, and varied between \$0 and \$42 per month. These additional benefits cost about 7.5% of the APR, on average. One plan reported additional benefits costing nearly 16% of the APR.

f. Total Savings

Total Savings averaged \$14 per month, and ranged from \$0 to \$66 per month.

g. Allowed Premium; Ratio of Allowed Premium and ACR; Amount of Allowed Premium that Was Waived

Based upon HCFA's formula, the average allowed premium was \$36 per month which represented 19% of the APR. Out of this \$36, plans waived an average of \$10 of this allowed premium. The amount waived had a

very large variability: the standard deviation was \$14 and the waived premium varied from \$0 to nearly \$78 per month.

#### h. Administrative Costs and Profits; Ratio of these Costs With the Initial Rate

These two cost elements are grouped together in the ACR submission. They reflect the total administrative costs and profits for the under 65 population. The average was \$8.95 per month, and the low and high values were \$.30 per month and \$26 per month. They represented 15% of the initial rate, on average. Administrative costs/profits in relation to the initial rate varied from 1.6% to 28%.

#### i. Time and Complexity Multipliers

##### (1) Hospital multiplier

The hospital multiplier had an average of 5.62. Its standard deviation (1.08) indicated that there was a fairly narrow spread of values for this quantity.

##### (2) Physician multiplier

The physician multiplier had an average of 2.75 and a standard deviation of 1.11. Compared with the hospital multiplier, the physician multiplier had a much broader range of values.

A more detailed description of the variations in hospital and physician multipliers is shown in Table 3.

##### (3) Ratio of ACR and Initial Rate

This ratio can be (at least roughly) thought of as an average multiplier which measures the relative costs (including any profits and administrative costs built in to the formula) between over 65 and under

Table 3: Frequency Distributions of Hospital and Physician Multipliers, 1987

a. Hospital Multiplier

Multiplier	Freq.	Percent	Cum.
<4	10	9.62	9.62
4-5	20	19.23	28.85
5-6	37	35.58	64.42
6-7	27	25.96	90.38
7-8	7	6.73	97.12
8-9	3	2.88	100.00
Total	104	100.00	

b. Physician Service Multiplier

Multiplier	Freq.	Percent	Cum.
1.	17	17.00	17.00
2.	53	53.00	70.00
3.	26	26.00	96.00
4.	4	4.00	100.00
Total	100	100.00	



65 populations, taking into account for each service, and then weighted according to the contribution of the particular service to the overall costs. The average multiplier was found to be 3.22; the multiplier varied from 2.09 to 9.07, and the standard deviation was 0.78. The smallness of the standard deviation suggests that except for a small number of outliers, the average multiplier clustered closely around the mean of 3.22.

### 3. Correlational Analysis: Some Preliminary Results

As a prelude to carrying out a more in-depth analysis of the causes behind variations in the ACR, we conducted a correlational analysis, examining zero-order correlations between the plan characteristics (i.e., those discussed in Section 1 above) and the various components of the ACR discussed in Section 2 above. The findings are summarized in Tables 4 and 5.

Table 4 displays the significant correlations between plan characteristics and the major variables discussed earlier. An asterisk in a particular cell indicates a correlation that is significant at the .05 level. These data were analyzed using a one-way analysis of variance. In Table 5, breakdowns of ACR components by plan characteristics are presented for the cases in which significant correlations are found.

The empirical results presented in Tables 4 and 5 are suggestive of a number of potentially revealing systematic patterns in ACR data. It should be pointed out, however, that these results reflect only bivariate relationships between ACR data and HMO and market attributes. The actual multivariate relationships among these variable may be quite

Table 4: Correlations\* Between Health Plan Characteristics and Elements Included in the ACR Submission, 1987

	<u>HMO</u> <u>Model</u>	<u>Profit</u> <u>Status</u>	<u>Size</u> <u>Mkt.</u>	<u>Exper</u> <u>ience</u>	<u>Memb.</u> <u>Size</u>	<u>Chain</u>	<u>Yrs in</u> <u>TEFRA</u>
Average Community Rate			*	*	*		*
Average Payment Rate	*		*	*	*	*	*
Ratio of ACR and APR		*	*				*
Initial Rate			*				
Total Cost of Additional Benefits							
Ratio of Costs of Add. Benefits and APR							
Total Savings	*				*		
Allowed Premium					*		
Ratio of Allowed Premium and APR			*	*			
Administrative Costs and Profit		*					
Ratio of Admin. Costs and Initial Rate		*					
Amount of Allowable Premium Waived							
Average Multiplier: ACR/Initial Rate							

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\*Significant correlations at the .05 level are indicated by an asterisk.

Table 5: Relationships Between Health Plan Characteristics and Elements Included in the ACR Submission for Elements Exhibiting a Significant Correlation, 1987

Characteristic	Staff	IPA	Network	Group
1. <u>Type of HMO</u>				
Average Payment Rate	204.71	185.51	186.85	203.83
Total Savings	21.72	10.69	32.89	10.43
2. Profit Status	Profit	Nonprofit		
Ratio of ACR and APR	0.95	1.01		
Administ. Cost & Profit	10.73	7.93		
Ratio:Admin./Initial Rate	0.176	0.13		
3. Market Size	1 HMO	2 HMOs	3+ HMOs	
Average Community Rate	174.42	185.99	199.73	
Average Payment Rate	174.11	185.23	212.66	
Ratio of ACR and APR	1.02	1.01	0.94	
Initial Rate	55.87	62.56	60.49	
Ratio of Allowed Premium & ACR	0.22	0.229	0.163	
4. Prior Medicare Exp.	Demo Site	Other*	None	
Average Community Rate	206.74	180.88	182.54	
Average Payment Rate	208.31	200.45	185.14	
Total Savings	18.61	21.94	9.03	
Allowed Premium	35.67	27.32	40.21	
Allowed Premium/ACR	0.179	0.141	0.212	
5. Medicare Membership	< 1000	1-5000	5-10000	10000+
Average Community Rate	173.34	191.65	195.52	202.58
Average Payment Rate	177.18	193.54	200.44	221.22
6. Part of HMO Chain	No	Yes		
Average Payment Rate	203.42	187.17		
7. Years in TEFRA	One	Two	Three	
Average Community Rate	179.81	182.84	191.64	
Average Payment Rate	183.14	181.62	201.29	
Ratios of ACR and APR	1.01	1.03	0.95	

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\*Prior cost contract or Part B contract

complex. Given that one may advance a large number of opposing but equally plausible explanations for many of these bivariate statistical regularities we feel it is premature to discuss these findings here. Findings of relevance to the conclusions of this study have been discussed in the main body of the paper.

#### 4. Changes in ACR elements over time.

The changes from 1986 to 1987 in selected quantities are shown in Table 6. For the sample of plans reviewed by us, a 7.7% increase in ACR was found while the APR increased by only 1.6%. The ratio of the ACR to the APR was found to increase by 6.1%. Each of these quantities had large standard deviations relative to their mean change. Although a more complete correlational analysis would be necessary to fully interpret these results, they suggest that there were wide variations from one year to the next in the relationship between expected plan revenues and expected costs. These findings are in accord with discussions with a number of HMOs; in some cases it appeared that large increases in the APR from one year to the next were much larger than was necessary to offset increased costs, while for other health plans, the opposite was true.

The hospital multiplier decreased, on the average, by a small amount (0.13) from 1986 to 1987. The physician multiplier had a substantially larger average decrease (0.57). Both of these quantities had large standard deviations, indicating that there was substantial random variations among the different health plans in these multipliers.

Table 6: Changes from 1986 to 1987 in Selected Items Reported as  
Part of ACR Submission

<u>Quantity</u>	<u># Obs.</u>	<u>Mean</u>	<u>St Dev</u>	<u>Min</u>	<u>Max</u>
ACR*	139	0.077	0.158	-0.194	1.129
APR*	139	0.016	0.063	-0.171	0.229
ACR/APR*	139	0.061	0.147	-0.248	1.083
Hospital Multiplier	53	-0.13	1.21	-2.99	2.39
Physician Multiplier	67	-0.574	2.44	-15.19	3.39

\*The change reported for this quantity is the proportional change from 1986 to 1987

## APPENDIX B

### HMO SURVEY PROTOCOL

This appendix summarizes the questions comprising the protocol used in the interviews of HMOs. Part 1 of the protocol addresses the concept of the ACR. These questions were asked of individuals capable of assessing the broader policy context of the ACR (e.g., HMO executive officers). Part 2 addresses the ACR methodology. These questions were asked of individuals responsible for preparation of ACR proposals. Part 3 of the protocol encompassed suggestions for improvements and alternatives to the current ACR methodology. Its structure was less formal since the nature of suggestions were associated with responses to questions from the first two parts.

The basic protocol outlined below was also used for interviews of actuarial consultants and review staff of HCFA's OFM. In the case of consultants it was slightly modified to capture the cross-plan perspective of these consultants. The protocol was modified for interviews of OFM staff to include questions about regulatory burden.

#### PART 1: THE ACR CONCEPT

##### 1. HOW HAS YOUR PLAN'S EXPERIENCE WITH THE TEFRA RISK PROGRAM BEEN?

A) HAS IT BEEN OK ENOUGH TO CONTINUE, OR ARE THERE SERIOUS PROBLEMS?

B) IS FEE-FOR-SERVICE EXPERIENCE, I.E. THE AAPCC, A SATISFACTORY WAY TO PAY HMOs?

C) HOW DOES THE ACR FIT INTO THE OVERALL PICTURE?

##### 2. COULD THE ACR CONCEPT REALLY BENEFIT ANYONE?

- BENEFICIARIES
- HMO INDUSTRY
- SPECIFIC PLANS

3. COULD SOME HMOs BE HURT BY THE ACR, E.G. BY HAVING TO OFFER EXTRA BENEFITS?
4. IS TRYING TO PEG MEDICARE PROFITS AT THE SAME LEVEL AS COMMERCIAL ENROLLEES APPROPRIATE?
5. IF THERE WERE NO ACR, HOW WOULD BENEFITS AND PREMIUM LEVELS BE DIFFERENT?
6. WHAT KINDS OF DATA OUGHT THE FEDERAL GOVERNMENT REQUIRE OF HMOs?
7. SHOULD CAPITATION PAYMENTS BE AFFECTED BY ANY DATA THAT IS REQUIRED TO BE REPORTED?
8. WITHOUT THE ACR, HOW WOULD THE MARKET PLAY OUT IN TERMS OF COMPETITIVE PRESSURE TO LOWER PREMIUMS AND ENHANCE BENEFITS?
9. IF MARKET COMPETITION DICTATES A FINANCIAL LOSS IN THE MEDICARE MARKET, HOW LONG COULD THIS STRATEGY CONTINUE?
10. ARE THERE ALTERNATIVE USES OF ACR SAVINGS THAT WOULD BE MORE BENEFICIAL TO MEDICARE ENROLLEES IN THE LONG RUN RATHER THAN REDUCED PREMIUMS OR BENEFITS?
11. IN AREAS WHERE COMPETITION ISN'T SO KEEN, HOW MIGHT HMOs USE THE SAVINGS IF THERE WERE NO ACR REQUIREMENTS?
12. WHAT SHOULD THE FEDERAL GOVERNMENT DO IN TERMS OF REGULATING THE INDUSTRY, IN ORDER TO SAFEGUARD BENEFICIARIES, INDUSTRY INTEGRITY, ETC.?

## PART 2. ACR METHODOLOGY

1. WHAT TYPE OF ADDED RESOURCE BURDEN DOES ACR COMPLIANCE PLACE ON YOUR PLAN RELATIVE TO THAT WHICH WOULD BE REQUIRED ANYWAY FOR OTHER ACTIVITIES SUCH AS RATE DETERMINATION, BUDGETING, OR RATE FILING FOR STATE REGULATIONS ?
2. BASED ON YOUR EXPERIENCE HOW ACCURATE HAVE YOUR ACR PROJECTIONS BEEN RELATIVE TO ACTUAL REVENUE AND CAPITAL REQUIREMENTS FOR SERVING THE MEDICARE POPULATION?
3. IF THE ACR REQUIREMENT WAS ABOLISHED, HOW WOULD YOUR PLAN SET PREMIUMS AND BENEFIT PACKAGES FOR THE MEDICARE POPULATION?  
- HOW WOULD THIS DIFFER FROM THE ACR APPROACH?
4. ARE THERE ANY DIFFICULTIES ASSOCIATED WITH PROJECTION OF YOUR COMMUNITY RATES FOR COMMERCIAL MARKETS?
5. WHAT DIFFICULTIES, IF ANY, HAVE YOU EXPERIENCED IN COLLECTING THE NECESSARY DATA FOR DEVELOPMENT OF VALID UTILIZATION OR COMPLEXITY ADJUSTMENT FACTORS?

6. ARE THE DATA AVAILABLE IN HCFA'S BIBLIOGRAPHY USEFUL IN SITUATIONS WHERE ACTUAL PLAN DATA FOR MULTIPLIER DEVELOPMENT ARE NOT AVAILABLE?
7. HOW WELL DO YOU THINK YOUR UTILIZATION/COMPLEXITY FACTORS REFLECT THE TRUE DIFFERENCES IN THE RELATIVE COSTS OF SERVING MEDICARE AND NON-MEDICARE POPULATIONS?
8. WHAT TYPES OF ASSUMPTIONS WERE USED TO PROJECT MEDICARE PAYMENTS FOR THE CONTRACT YEAR?
  - HOW HAVE YOUR PROJECTED APRs COMPARED WITH ACTUAL AAPCC PAYMENTS FOR PAST CONTRACT YEARS?
9. HOW WERE ADDITIONAL BENEFITS ARISING FROM ACR SAVINGS CHOSEN?
10. DO ACR SAVINGS REQUIREMENTS LEAD YOU TO OFFER MORE BENEFITS THAN MARKET COMPETITION WOULD DICTATE?
  - HOW MIGHT THE MIX AND/OR VALUE OF ADDITIONAL BENEFITS AND PREMIUMS BE CHANGED IF THE ACR WERE ABOLISHED?
11. COULD THE BENEFIT STABILIZATION FUND BE A USEFUL OPTION FOR THE ALLOCATION OF ACR SAVINGS? WHY HAVE YOU USED/NOT USED THE BSF THUS FAR?

### PART 3. SUGGESTED MODIFICATIONS OR ALTERNATIVES TO THE ACR

1. CAN ANY OF THE SHORTCOMINGS OF THE ACR WHICH WE HAVE DISCUSSED BE RECTIFIED?
  - ARE THERE SUGGESTED MODIFICATIONS TO THE ACR METHODOLOGY THAT COULD IMPROVE ITS VALIDITY OR RELIABILITY?
  - COULD THEY BE EASILY IMPLEMENTABLE?
  - WHAT ALTERNATIVES TO THE ACR MIGHT MEET ITS PURPOSES?



## APPENDIX C

### AN EXAMPLE OF THE ACR METHODOLOGY

In this appendix we present a simplified example of the standard ACR methodology as recommended to HMOs by HCFA's Office of Financial Management. The example draws heavily from a more detailed example created by the OFM which it uses in informational seminars conducted for HMOs. Table 1 contains the numerical dollar amounts which result from the steps outlined below.

1. Lines 1 through 4 in Table 1 represent the service categories included in the standard Medicare benefit package and other services not included in Medicare but included in the average premium the HMO charges in its commercial market. In the example here, the HMO base rate includes hospital, physician, and drug benefits. DME benefits are not provided in the basic package to the nonelderly. The total base rate in line 5 is \$60.

2. The second column in the table contains adjustments that are applied to the HMO's base rate to yield the initial rate. In this example, the HMO might provide unlimited hospital day coverage, where Medicare does not. An adjustment of \$0.50 per member per month is subtracted from the base rate. This amount might be derived from the following HMO data.

	Non-Medicare
Total inpatient days/1000	454
Days in excess of Medicare limits/1000	16
Average cost per inpatient day	\$373.35

The adjustment of \$0.50 is derived by multiplication of lines 2 and three above for divided by 12,000 enrollee months.

Medicare coverage does not cover drugs so \$5 is the adjustment for drugs subtracted from the base rate. Medicare does cover DME whereas the HMO does not offer this benefit. An adjustment of \$1 is derived by the HMO on the basis of primary or secondary data. This is added to the base rate. The initial rate for Medicare services for the HMO based on their community rate is now \$55.50.

3. This initial rate must now be adjusted to reflect the greater utilization of services and the greater service intensity of the Medicare population. The fourth column contains a set of utilization/complexity factors to be applied to the initial rate. These utilization factors can be derived from approved secondary data or based on the actual experience of the HMO. Below we illustrated how the hospital inpatient factor might be derived from historical utilization data.

a. Non-Medicare inpatient days/1000 (within Medicare limits)	438
b. Medicare inpatient days/1000 (within Medicare limits)	2125
c. Non-Medicare cost/day	\$373.35
d. Medicare cost/day	\$315.48
e. Utilization factor (line b/line a)	4.851
f. Complexity factor (line d/line c)	0.845
f. Utilization/complexity factor (line e x line f)	4.099

4. Multiplying the initial rate by service category yields the projected service-specific community rate for the Medicare population. The sum of these service rates is shown as line 5.

5. Line 6 contains general administration and profit associated with the HMO's commercial premium business. It includes a variety of expenses as well as a return or profit. The OFM accepts three approaches to projecting administration and profit to the Medicare population. The ratio method shown here incorporates a constant percentage of ADM&GEN to service premiums. ADM&GEN are 1/6 of the service premium subtotal (\$10/\$60). Taking 1/6th of the subtotals for the initial rate and the Part A and Part B columns yields the figures in line 6. An alternative method would hold the \$10 of ADM&GEN in the base rate constant amounting to a smaller fraction of ADM&GEN in the ACR rates. A third approach would adjust the \$10 of ADM&GEN in the base rate on the basis of volume and complexity factors analogous to those used to project service requirements. Line 7 is the subtotal with ADM&GEN included.

6. Line 8 contains liability reductions associated with the fact that the HMO's commercial premiums may include expenses associated with being the second payer for some services. Adjustments may also be necessary since Medicare is liable as the second payer for some services. In the example here these liabilities reduce the base rate by \$0.50. Line 9 is the resultant gross liability.

7. Line 10 contains the actuarial value of copayments (\$1.50/mo.) associated with the HMO's base rate. Subtraction of line 10 from line 9 yields a net monthly liability to the plan associated with its community rate. Alterations to the initial rate and the ACR rates are made later.

8. Line 12 contains the actuarial value of Medicare Part A and Part B deductibles and coinsurance. These national figures are supplied yearly by HCFA's Office of the Actuary. Subtracting these from the net monthly liabilities in line 11 yields the Part A and Part B ACR values as line 13.

9. Line 14 contains the average AAPCC payment for the HMO based on its projected distribution of enrollees in AAPCC risk categories. Subtraction of line 14 from line 13 yields the excess of expected Medicare capitation payments over the ACR. This is shown for Parts A and B in line 15.

10. The second page of Table 1 illustrates the general approach whereby savings as (95% AAPCC - ACR) are distributed into additional benefits and/or reduced premiums. Line 16 contains the Office of the Actuary's numbers for Medicare deductibles and coinsurance for beneficiaries with both Part A and B coverage and Part B only coverage. The latter is included since Medicare beneficiaries who are ineligible for Part A services may still enroll for Part B Medicare coverage in the HMO.

11. Line 17 contains the aggregated savings from line 15. Lines 18-20 contain data relevant to benefits in the standard HMO Medicare package that exceed standard Medicare coverage. The actuarial values for these services are again based on the HMO's average commercial premium. In the example here the HMO will offer three additional benefits. The base rate factors are adjusted by the Medicare population utilization/complexity factor to yield the actuarial equivalents in column three of the second page. Again, the utilization factors are based on actual or secondary data.

12. Line 21 contains an amount of the savings the HMO wishes to contribute to a benefit stabilization fund. These contributions are limited to 15% of savings in any year, to a maximum of 25% at any point in time, and must be used by the HMO within 4 years. In this example the HMO contributes 15% of savings to this fund.

13. Line 22 contains the amount by which the HMO will reduce Medicare deductibles and coinsurance amounts. Note that the HMO must distribute all savings. Thus in this example, this amount is simply line 17 minus the sum of lines 18 through 21. Line 23 shows the sum of lines 18 through 22 equal to line 17.

14. Line 24 is empty in this example. However, the HMO may offer further additional benefits over and above those in lines 18-20 and charge enrollees additional premiums for these benefits. Again the HMO must establish their value on the basis of it's average commercial premium.

15. Line 25 is the balance of Medicare deductibles and coinsurance after the reductions in line 22 associated with distributed savings. It is simply line 16 minus line 22.

16. Expected enrollee copayments are contained in line 26. This amount is derived from the actuarial value associated with the HMO's average commercial premium. A utilization/complexity factor is applied to adjust this amount for the Medicare services and the higher utilization of Medicare enrollees. This factor is generated from actual or secondary data.

17. Line 27 contains the maximum monthly premium a plan may charge to Medicare enrollees for its standard package. It is the result of subtracting copayments from line 25. Note that the HMO can charge less than this amount but no more since premiums and copayments may not exceed the Medicare actuarial amount contained in line 16 for standard Medicare services. If line 24 was not zero, the standard HMO Medicare package would include standard Medicare services, the additional benefits in lines 18 through 20, and the benefits contained in line 24. The actual Medicare premium can exceed \$12.50 under these conditions. If an HMO charges a premium that is less than \$12.50, it must maintain that premium throughout the one-year contract period. The HMO may lower this premium at the time of the ACR application, or afterward upon approval of HCFA.

TABLE 1

SERVICE CATEGORY	BASE RATE	ADJ.	INITIAL RATE	UTILIZ. FACTOR	ACR	
					PART A	PART B
1. HOSPITAL	30.00	(.50)	29.50	4.1	120.95	
2. PHYSICIAN	25.00		25.00	2.0		50.00
3. DRUGS	5.00	(5.00)	0.00			
4. DME	0.00	1.00	1.00	5.5		5.50
5. SUBTOTAL	60.00	(4.50)	55.50		120.95	55.50
6. ADM & GEN	10.00	(0.75)	9.25		20.16	9.25
7. TOTAL	70.00		64.75		141.11	64.75
8. LIABILITY REDUCTIONS	(0.50)		(0.50)		(0.25)	(0.25)
9. GROSS LIABILITY	69.50		64.25		140.86	64.50
10. LESS COPAYMENTS	(1.50)	1.50	-0-		-0-	-0-
11. NET LIABILITY	68.00	(3.75)	64.25		140.86	64.50
12. MEDICARE DED.&COIN.					15.26	22.33
13. ACR					125.60	42.17
14. AVE. AAPCC PAYMENT					162.50	60.50
15. SAVINGS					36.90	18.33

TABLE 1 (CONTINUED)

CATEGORY	BASE RATE	UTIL FACTOR	PART A & PART B	PART B ONLY
16. MEDICARE DED.&COIN.			37.59	22.33
17. AMOUNT AVAIL. FOR ADD. BENEFITS & BSF FUND			55.23	18.33
ADDITIONAL BENEFITS				
18. UNLIM. HOSP	0.50	5.5	2.75	
19. OPTICAL	0.30	3.5	1.05	1.05
20. DRUGS	5.00	4.0	20.00	
21. BSF FUND (15% LINE 17)			8.29	2.75
22. REDUCTIONS IN DED. & COIN			23.14	14.53
23. TOTAL ADD. BENEFITS			55.23	18.33
24. ADD.SERVICES BASIC PACKAGE				
25. BALANCE OF DED. & COIN			14.45	7.80
26. LESS COPAYS	(1.50)	1.3	(1.95)	(1.95)
27. MONTHLY PREM BASIC PACKAGE			12.50	5.85

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